

SEPTEMBER, 1955

Commercial Fertilizer

and PLANT FOOD INDUSTRY



Arcadian

PRODUCTS FOR PROFITABLE FARMING

Nitrogen Solutions
(Nitrana® and Ureana®)
Sulphate of Ammonia

American
Nitrate of Soda

A-N-L®
Nitrogen Fertilizer
Urea Products

Popularity of 10-10-10, of 12-12-12 and higher-analysis balanced fertilizers keeps climbing, as more and more farmers find their heavily-cropped soils pay off better with more N-P-K plant food. The saving on bag-lifting with the concentrated new products helps them sell all the faster.

Tonnage of 10-10-10 in 1952-53 was only tenth among mixed fertilizers. By 1953-54 it had already jumped to fourth place. In this one year's time, tonnage of 1-1-1 ratio fertilizer (10-10-10 or better) increased from 490,000 tons to over 937,000 tons.

Are you set for this growing 1-1-1 market that puts more profit as well as more plant food in every ton you sell? You can make better quality, faster curing, dustless, free-flowing 1-1-1 mixed goods with ARCADIAN® Nitrogen Solutions and ARCADIAN Sulphate of Ammonia. These economical sources of nitrogen also give you desired nitrate and ammonia balance. For details, see a Nitrogen Division technical service representative. His services are available to customers at no cost.

NITROGEN DIVISION Allied Chemical & Dye Corporation
New York 6, N. Y. • Ironton, Ohio • Omaha 7, Neb.
Atlanta 3, Ga. • Hopewell, Va. • Indianapolis 20, Ind.
Columbia 1, S. C. • San Francisco 3, Cal. • Los Angeles 15, Cal.





Three of the A.A.C. Co's electrically-operated draglines at work at our phosphate mines in Central Florida. Bucket capacities range from $9\frac{1}{2}$ to 17 cubic yards. The 17-yard draglines with their 175-foot booms each weigh more than a million and a half pounds and can move 35,000 tons of material in 24 hours. From these rock deposits flow a continuous stream of high quality phosphate rock, assuring a dependable source of supply of AA QUALITY phosphorus products, see list below.



AA Quality...

for over 85 years a symbol of quality and reliability

principal AA QUALITY products

All grades of Florida Pebble Phosphate Rock

AA QUALITY Ground Phosphate Rock

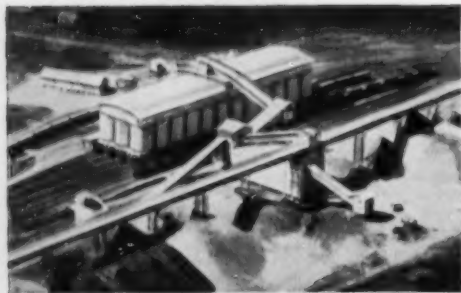
All grades of Complete Fertilizers Superphosphate

Gelatin Bone Products Salt Cake Ammonium Carbonate

Sulphuric Acid Fluosilicates Insecticides and Fungicides

Phosphoric Acid and Phosphates

Phosphorus and Compounds of Phosphorus

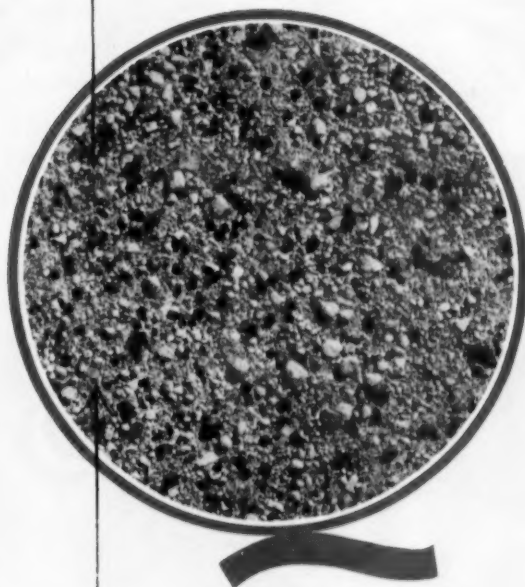


From the air—wet rock storage and drying plant, with dry rock storage silos in background. These silos, 29 in number, have a total capacity of 40,000 tons of dried rock. Under the silos are four runways where 40 railroad cars can be loaded at a time.

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PLAINLY VISIBLE in any good fertilizer mixture are the dark organic particles of Smirow... a sales feature easy to point out, and a satisfying mark of quality to farmers.

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A DIVISION OF SMITH-DOUGLASS CO., INCORPORATED
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More farmers
will fertilize
this fall...

FALL FERTILIZATION has a two-fold advantage. Fertilizing in the fall or winter means valuable time saved for planting when the spring rush is on . . . and crops get an earlier start when fertilizers are in the root zone *early enough* to take advantage of the first warm weather.

Leach-Resisting Nitrogen Source

USS Ammonium Sulphate is a most efficient and practical source of nitrogen for fall fertilizing. That's because it's a *dry, free-flowing* ammonia type nitrogen that can be spread and plowed down (straight or in mixes) with ordinary equipment, any time you can get over the ground. Applied in the fall, the nitrogen in ammonium sulphate resists leaching throughout the winter, remaining locked in the soil until spring . . . when it goes to work "digesting" crop residues.

Four-Star Sales Boosters

To boost *your* sales of this product, advertisements featuring USS Ammonium Sulphate are placed in national and state farm magazines that reach *over two-and-a-half million farmers*. Nearly seven hundred radio broadcasts encourage the year-round use of this all-around fertilizer. News-



paper mats are available . . . and four valuable FREE folders, available in quantity, fully describe application methods and recommended amounts of USS Ammonium Sulphate. Take advantage of this national campaign by making sure your dealers have a supply of folders. Encourage them to use the mats in their local papers . . . stock—and use—USS Ammonium Sulphate.

SEE The United States Steel Hour. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

COMMERCIAL FERTILIZER

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Please send me FREE:

....of each ammonium sulphate folder.....one column mats
.....two column mats. (fill in number desired)

Name

Address

City State

UNITED STATES STEEL

September, 1955



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Commenting Freely

by BRUCE MORAN

Don Paarlberg, assistant to the Secretary of Agriculture has a set of computations to show that the decline in farm income is not nearly so bad when you check it as a decline in farmer income. In other words, the percapita basis is more nearly comparable with the general economic level as compared to the farm level back before the golden era of midnight plowing.

And there's a lot in what he says, but the fact still remains that fertilizer has to be sold against farm income, rather than percapita income, no matter how much a farmer may make with sidelines. And farm income is down.

I wish I had the figures broken down to show the income of the 2,000,000 farmers who produce

88%, as against that of the other 3,500,000 farms that only produce 12% of the total farm products. Then I wish I could compare fertilizer sales per-capita, or per-acre, or per-any-measure-you'd-care-to-name, and see if the centralization of agriculture into fewer hands is not a pretty fine and healthy thing for our industry, however bad it may be for the inefficient fringe farmer and his folks.

Maybe Dan Paarlberg could turn his statisticians loose on that one for us.

But the real point is that we must sell the efficient farmer on using all the fertilizer he needs for his soil and his crops in his climate. Do that, and we'll be madly building capacity again.

Vol 91 No. 3

Established 1910

September, 1955

Commercial Fertilizer

and PLANT FOOD INDUSTRY

Subscription rates: United States, \$3.00 per year; 5 years, \$12.00. Foreign \$5.00 per year.

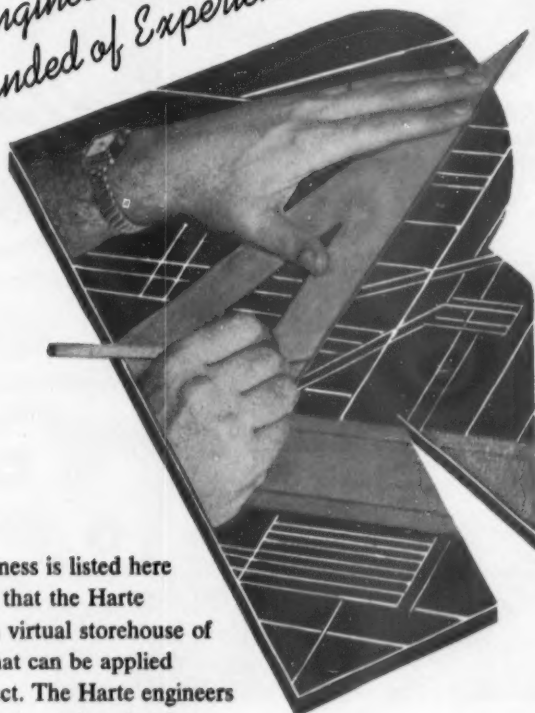
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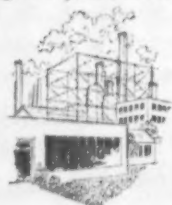
... is roughly one cubic foot of NITROGEN gas. Floating free in the air this nitrogen can't add to America's agricultural or industrial wealth. But Grace Chemical Company has opened a plant in Memphis, Tennessee, that "fixes" atmospheric nitrogen in the form of two very versatile compounds—ammonia and urea. (Shown in the photo are prills—tiny beads—of urea containing the equivalent to the amount of nitrogen gas between you and this page.)

Fixed in this way, nitrogen can enrich our crop farms, our livestock, and our homes—

through its use in fertilizers, feed supplements, and the manufacture of products ranging from toothpaste to television cabinets.

Output of the \$20,000,000 Memphis plant will be 72,000 tons of nitrogen a year. It will provide industry and agriculture these two forms of nitrogen from a *dependable* source—backed by a world of experience.

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COMMERCIAL FERTILIZER

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granulated
fertilizer manufacturers
are turning to
LOUISVILLE rotary dryers
rotary coolers
to speed production...reduce drying costs



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BEGINS SHIPMENTS JAN. 1, 1956

Coming Soon!!!

A complete line of nitrogen chemicals—tailor-made to suit the most complex requirements of the fertilizer industry.

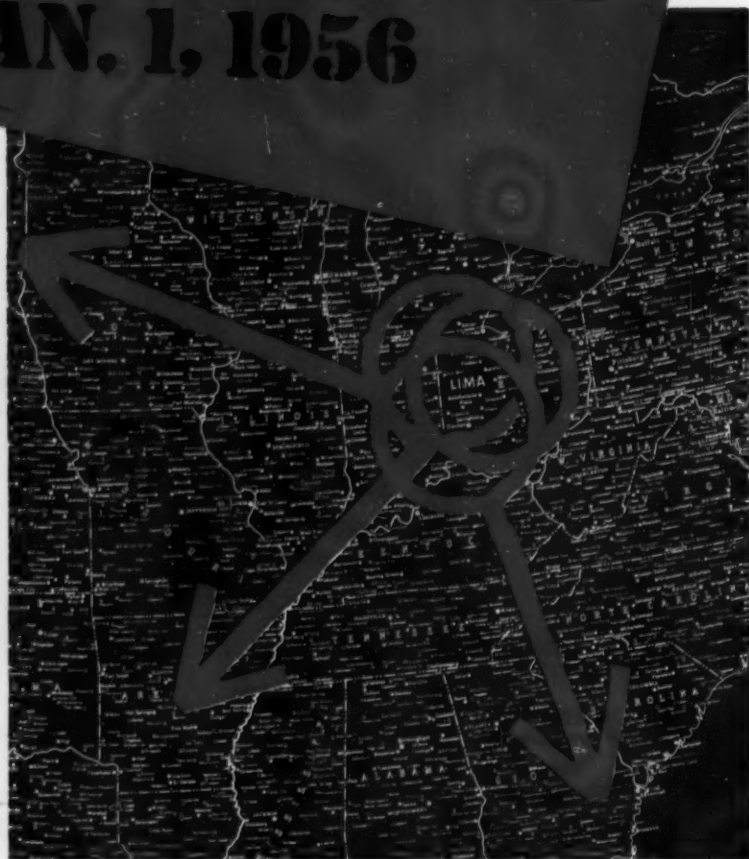
Anhydrous Ammonia	Urea
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Nitrogen Solutions	Nitric Acid

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Ready to serve your needs faster and more economically—is our fleet of new tank cars, tank trucks, and van drays.

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Production of our complete line of nitrogen chemicals gets underway this fall at our new Lima, Ohio plant. But . . . in order to serve you better during your peak season, we will accumulate most of our production in our huge storage facilities until the first of the year. Then . . . on January 1, 1956 we will begin shipments against contracts.



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and price quotations . . . write to

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G

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FOR ANY SIZE
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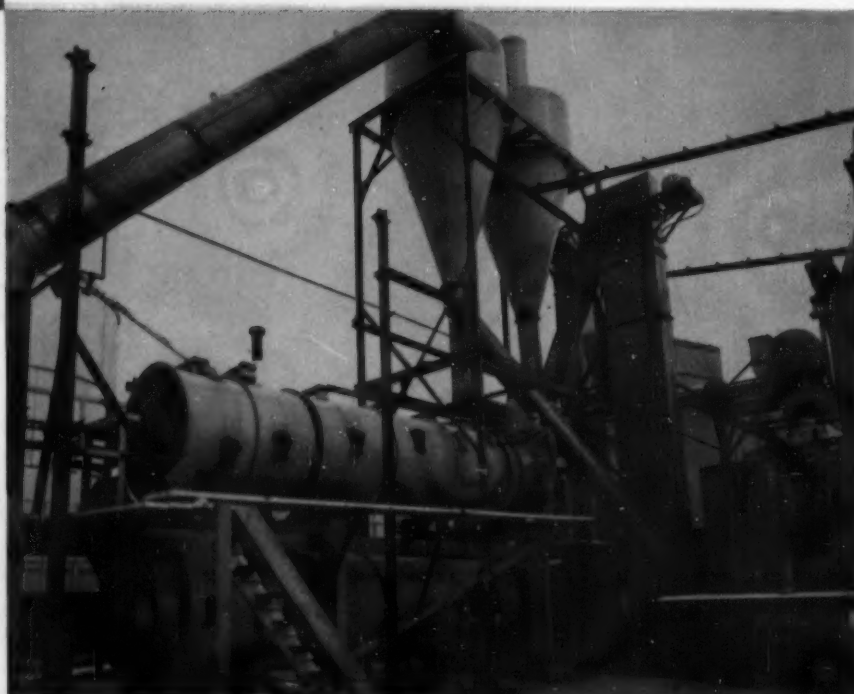
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Profits*

CUTS CURING TIME

REDUCES INVENTORY

INCREASES PRODUCTION

ENGINEERED FOR YOU



To realize *more profit* in fertilizer manufacturing, more plants are using Blue Valley Granulators to produce granular fertilizer! A Blue Valley Granulator gives you the lowest first cost . . . lowest installation cost . . . and lowest operating cost . . . yet it produces highest quality granular fertilizer from the lowest cost materials available to you. All this adds up to *more profit* for your plant, so write, wire, or call us now—

BLUE VALLEY ENGR. & EQUIP. MFG. CO.

LAURENT AND N. TAYLOR

TOPEKA, KANSAS

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Installation Pictured Above, Farm Chemical Co., Longmont, Colorado

BE WISE . . .



GRANULATE THE
GLASPEY WAY
IT'S PROVEN

JUST AROUND THE CORNER *by Vernon Mount*

BIG BUSINESS vs THE PEEPUL is the theme of the campaign already underway for the 1956 Presidential election. Ike will be pictured as the captive of the Ogres of Wall Street. The whole thing will sound like the old days--a slap-bang extension of the technic which brought Truman back from the political dead 8 years ago.

UNORGANIZED, business can't or won't defend itself. Executives will look up from their papers, puzzled, a bit distressed...and go back to work. But so long as enough people are on the best payrolls they have ever known, with the fewest unemployed your correspondent can remember, and only the economic fringe of small farmers to be at all vocal about falling markets...the present outlook is for more of the same for the next 4 years. But we were all of us wrong in 1948.

Yours faithfully,

Vernon Mount

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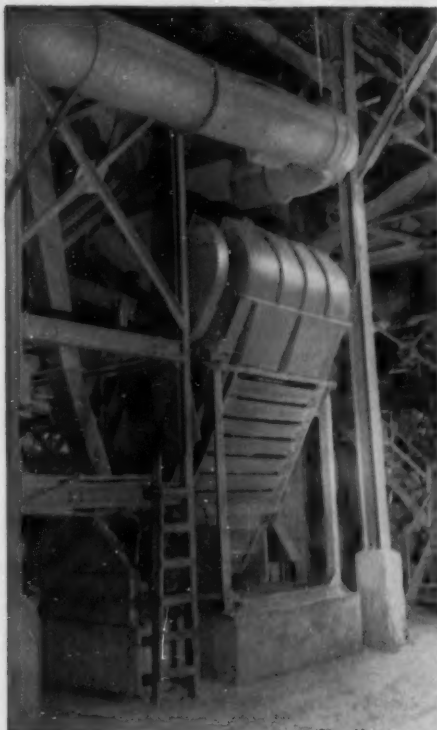
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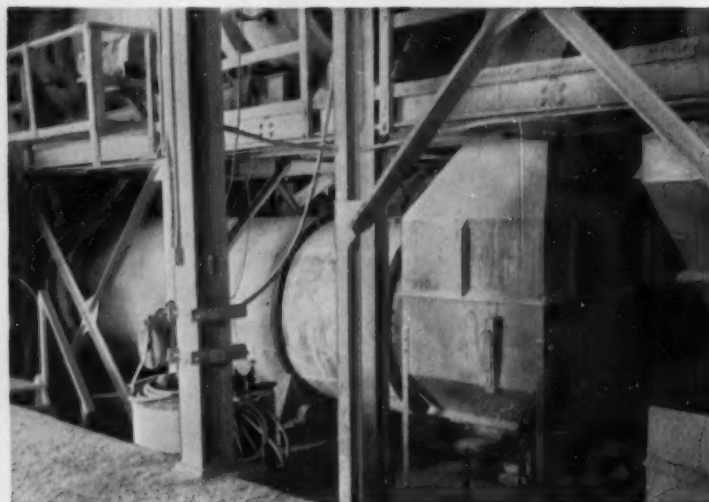
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Need processing, transmission or conveying equipment ...or counsel... for fertilizer plant operations? Get any or all from **LINK-BELT**



50% more production resulted at Iowa Farm Supply Co., Des Moines, through the aid of Link-Belt engineering counsel. Link-Belt equipment here includes Multi-Louvre Cooler (left), Roto-Louvre Dryer (below), bucket elevator, vibrating screens and power transmission machinery.



Here's how you can produce higher grade fertilizer ... at lower cost

This plant demonstrates what can be accomplished with the right choice of dependable equipment plus sound engineering methods. And you can count on Link-Belt for similar high efficiency—with needs ranging from a few pieces of equipment to major elements of a plant.

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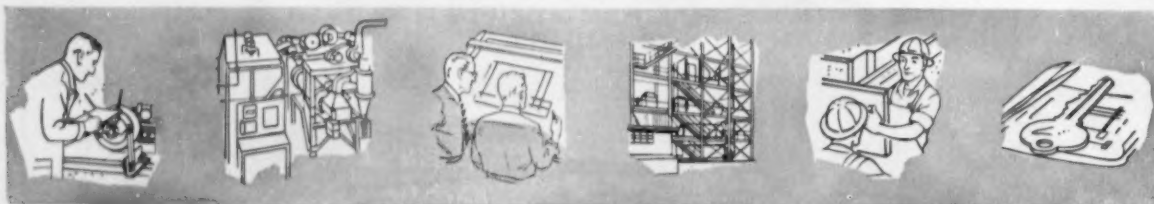
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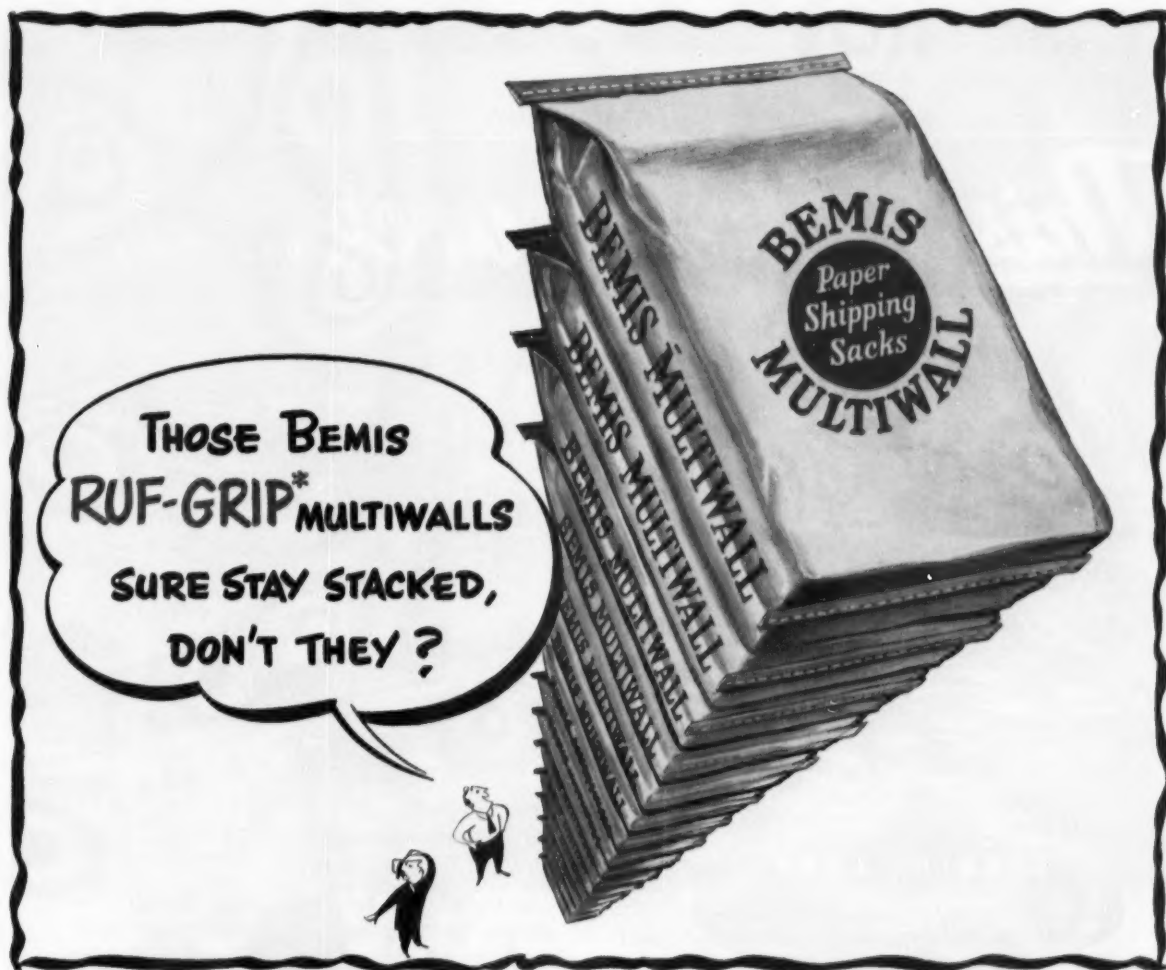
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ENGINEERING

QUALITY
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SKILLED
ERECTION CREWS

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View of main plant of
American Potash & Chemical Corporation
at Searles Lake, Trona, California

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INDISPENSABLE TO INDUSTRY AND AGRICULTURE

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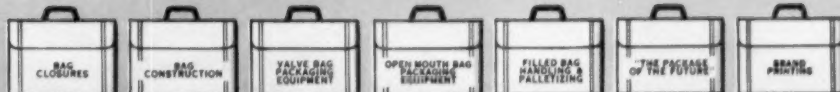
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Potash, a major component of modern commercial fertilizers, improves crop quality as well as enriching the soil, building crop resistance to disease and increasing total product yield. USP's high-grade muriate of potash is free-flowing and non-caking—important advantages in the production of fertilizers that help make the sweet-tasting apple make sweet profits for the grower.



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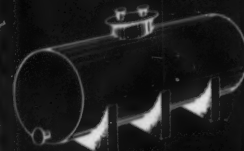
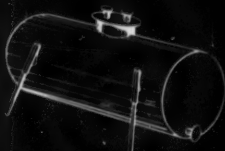
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Address _____

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Zone _____

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Solve liquid fertilizer storage problems quickly, economically and efficiently. A&C rubber-lined tanks are ready for prompt delivery. They assure complete corrosion protection from both phosphoric acid and nitrogen solutions . . . cost far less than any other type of dual-purpose tank. Send coupon for complete information today!



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ASA

DAVIS MEETING A RECORD BREAKER

From the first session sponsored by the National Joint Committee on Fertilizer Application on Monday morning to the last moment of the Hawaiian luau on Thursday evening, the meetings of the American Society of Agronomy held at Davis, California August 15-19 were record breaking in almost every respect.

More than 1500 persons registered for the meetings. Add the families of the registrants and the total ran to well over 2,000 people. Over 1600 were fed at the Western barbecue on Monday night and there were not enough tickets for all who wanted to go to the Hawaiian luau on Thursday night.

The irrigation exhibit on Wednesday and Thursday featured equipment and machinery worth an estimated \$250,000, and attracted large crowds both days.

The Field and Furrow Club of the University of Illinois won the outstanding agronomy club award sponsored by the National Plant Food Institute consisting of a trophy, a check for \$100 for the club and an additional \$100 scholarship for a member of the club.

Twenty eight men were awarded the highest honor of the Society when they were elected Fellows. Dr. **Werner L. Nelson**, American Potash Institute, Lafayette, Ind. was the lone industry representative receiving the honor. Others included Dr. **H. H. Kramer**, Dr. **Ralph M. Caldwell**, Dr. **G. O. Mott**, Purdue University; Dr. **G. F. Markle** and Dr. **H. B. Musser**, Penn State University; Dr. **R. R. Robinson**, USDA, stationed at Penn State University; Dr. **H. D. Chapman**, U. of California, Riverside; Dr. **S. J. Richards**, U. of California, Riverside; Dr. **J. P. Conrad**, U. of California, Davis; Dr. **C. A. Sune-son**, U. of California, Davis; Dr. **G. H. Gungan**, Dr. **J. E. Giesekeing** and Dr. **E. H. Tyner**, U. of Illinois; Dr. **J. M. Pohlman** and Dr. **C. M. Woodruff**, U. of Missouri; Dr. **H. L. Shands**, U. of Wisconsin; Dr. **H. C. Knoblauch**, USDA, Washington, D. C.; Dr. **D. F. Beard**, USDA, Beltsville; Dr. **W. E. Colwell** and Dr. **R. P. Harvey**, North Carolina State College, Raleigh; Dr. **R. P. Murphy**, Cornell University; Dr. **A. L. Hafenrich-ter**, USDA, Portland, Ore.; Dr. **Wes-ley Keller**, Utah State College; Dr.

Kling Anderson, Kansas State Col-lege; Dr. **G. M. Browning**, Iowa State College; Dr. **W. S. Ligon**, USDA, Knoxville, Tennessee; and Dr. **G. W. Volk**, Ohio State University.

Officers of the Society for the coming year are Dr. **Iver Johnson**, Iowa State College, president; Dr. **A. J. Norman**, University of Michi-gan, vice-president; Dr. **D. W. Thorne**, Utah State Agricultural Col-lege, president of the Soil Science Society of America; Dr. **G. O. Mott**, Purdue University, president of the Crop Science Division of the Society; Dr. **D. S. Metcalfe**, Iowa State Col-lege, president of the Agronomic Education Division.

The three top places in the student essay contest sponsored by the Soci-ty were won by **Donald M. Faulkner** with an essay on Agricultural Ex-tension Publication, **Charles M. Mur-phy**, Iowa State College, with Atomic Varieties; and **Dean L. Swedlund**, Iowa State College, writing on Fall Fertilization.

The Society set the meeting places and dates for the next five years as follows: 1956, Cincinnati, Nov. 12-16; 1957, Atlanta, Nov. 18-22; 1958, Madis-on, Wisconsin, Aug. 25-29; 1959, Cincinnati, Nov. 9-13; and 1960, Denver Colorado, Oct. 31-Nov. 4.

PRESIDENT'S ADDRESS

A reduction of land acreage under cultivation in the Middle Appalach-ian area which started in 1935 may be expected to continue, **Gordon G. Pohlman**, head of the Department of Agronomy at West Virginia Uni-versity, told members of the Ameri-can Society of Agronomy.

Pohlman's talk, "The Hills of Home," was illustrated with slides and was the traditional presidential address to the Society. It dealt with contributions of the Appalachian area in the nation's development.

The talk was delivered following the annual Society dinner on the University of California campus. The West Virginia agronomist, who has served as head of the Society during the past year, was succeeded as president by **Iver Johnson**, of Iowa State College, in ceremonies at the end of the evening's program.

Retirement of land not suited for cultivation, encroachment of villages

and cities, and industrial expan-sion have all played a part in the reduction of cultivated acreage, **Pohlman** said in his address. Many so-called commercial farms, with relatively small acreages of land suited to machinery, have been able, by using much hand labor, to provide a living for the farm family.

Some of the more energetic in this group have turned to more in-tensive enterprises—broiler produc-tion, turkeys, small fruits, truck farming, and tobacco — and with good management have improved their living standards. Such a change in type of farming seems necessary if these farms are to continue to con-tribute to our national welfare.

STRUCTURE

Good structure can be built back into compacted and eroded soils, and there are methods by which the process can be speeded, said three soil specialists from Richmond, Ind., **David Telfair**, **Murvel R. Garner**, and **David Miars**, reporting on a 2-year study at Earlham College, Richmond, and described results in restoring good tilth in tight, compact soils.

Organic matter speeds up the re-covery process, largely through the resulting activity of earthworms and ants. Wetting and drying was found to contribute by causing shrinkage cracks, which in turn allow plant roots to enter more easily.

ROOT PENETRATION

Soil can become too tight for corn roots, say **A. R. Bertrand** and **H. Kohnke** of Purdue University.

In experiments corn roots did not penetrate packed subsoil, but they did grow profusely in the same sub-soil when it was loose. Even addi-tion of large amounts of fertilizer to it did not cause roots to grow into the tight subsoil.

Plant roots can be induced to penetrate deeper into the ground and thus to make use of the water found at these depths.

Experiments started in 1951 at Lafayette, Ind., have shown that loosening subsoil to a depth of 20 inches and supplying complete fer-tilizer to it can induce plant roots to descend further down.

WATER

WITH FERTILIZER

A spectacular increase in the use of liquid fertilizers and in their application through irrigation water in California and the arid Southwest was described by **H. D. Chapman**, head of the Department of Soils and Plant Nutrition, Citrus Experiment Station, Riverside, Calif.

He said that at present there are some 82 different registrants marketing liquid fertilizer in California. Some 200 different brand names are on the market.

SUCKED IN

Water does not "fall into the soil" by gravity, but is sucked from the irrigation furrow by capillary pull of the soil pores, just as a blotter sucks up an ink blot.

Only when the soil is nearly saturated does water literally fall into the soil, **V. S. Aronovici** and **Gilbert Corey**, of the USDA Soil and Water Conservation Branch, said. The paper dealt with how much, how fast, and where water goes from an irrigation furrow into the soil. Reporting on tank tests at the Pomona Irrigation Laboratory, Pomona, Calif.

WATER-PHOSPHORUS

A direct relationship between the uptake of phosphorus by barley seedlings and the moisture level in the soil was described by **G. G. Williams** of Purdue University, who said there was very little, if any, phosphorus taken up by plants from soil which was at or below the wilting point. As the soil moisture was increased, there was a great increase in phosphorus uptake.

POOR STORAGE

Poor storage appears to be one of the factors causing "hot-spot" areas on cotton fields in the Mississippi Delta Region.

In a paper prepared by himself and **C. W. Dombey**, now deceased, **V. C. Jamison**, who is stationed at Columbia, Mo., said that such hot-spot areas are prevalent in Delta fields during droughty periods. Cotton, soybeans, and other crops wilt in these areas before those in the rest of the field.

WHEAT SEEDLINGS

Soil moisture, oxygen diffusion into the soil, and soil crust strength were listed among many factors which affect emergence of wheat seedlings by **R. J. Hanks** and **F. C. Thorp**, of the USDA and the Kansas Agricultural Experiment Station.

Speaking at a session of the Soil Science Society of America, Hanks and Thorp said that, in work at Manhattan, Kans., it was found that ultimate seedling emergence was not limited as long as the moisture content of the soil was maintained within a range between field capacity and permanent wilting percentage. However, the seedlings emerged quicker the more moist the soil.

TESTING

Methods for predicting the moisture content in the surface foot of soil are being developed by the Southern Forest Experiment Station at the request of the U. S. Army, which needs to know when military vehicles can move across country without getting mired, **K. G. Reinhart** and **J. S. Horton** of Vicksburg, Miss., pointed out. As soil strength depends to a great extent on the moisture content, a means of predicting soil-moisture changes was needed.

SALT ADDED

Six common alfalfa varieties dif-

fered considerably in yields when they were irrigated with water containing small or moderate amounts of salt, but the varietal differences disappeared when extremely salty irrigation water was used, 3-year tests at the U. S. Salinity Laboratory, Riverside, Calif., have shown.

J. W. Brown and **H. E. Hayward** made this report which covered irrigation treatments for alfalfa with waters containing four levels of salt: control, 450 parts per million; low salt, 3000 p.p.m.; intermediate salt, 6000 p.p.m.; and high salt, 9000 p.p.m.

IRRIGATED GRASS

Farmers buying irrigation water can expect a greater return per dollar invested by planting Coastal Bermuda grass, a comparatively new forage and pasture grass for the southern states, rather than Pensacola Bahia or common Bermuda grasses, said three Georgia agronomists. The three are **Glenn W. Burton**, **E. H. DeVane**, and **Gordon M. Prine**, all of the Coastal Plain Experiment Station, Tifton, Ga. They warned, however, that this does not mean that irrigation will always be profitable on Coastal Bermuda.

NITROGEN

SPEEDS UPTAKE

Addition of nitrogen fertilizers generally increased the plant uptake of fertilizer phosphorus from a band of concentrated superphosphate, it was found in a study at the Northern Great Plains Field Station, Mandan, N. Dak.

Davis L. Grunes and **S. H. Shih** told of the results obtained.

HELPS USE

An assist from nitrogen helps plants make better use of phosphorus.

A small amount of ammonium nitrogen compounded with or applied as another material with phosphate permits maximum phosphorus fertilizer uptake and efficiency, according to a University of Nebraska

FIELD AND FURROW, student agronomy club at the University of Illinois, winner of the National Agronomy Achievement Award for 1955, received a silver trophy, and a check for \$100 from the National Plant Food Institute. Accepting (center) is Duane Swartz, president of the Club, while Dr. M. B. Russell (l.), club advisor looks on. Dr. Willard H. Garman (r.), chief of agronomic relations of the National Plant Food Institute, made the presentation August 17 during the annual meeting of the American Society of Agronomy in Davis, California.

The Illinois group, which has 75 active members, is one of 39 such student organizations at leading agricultural colleges of the U. S. All are members of the Student Section of the American Society of Agronomy. Dr. Richard M. Swenson, Michigan State University, chairman this year of the ASA Student Section, supervised the contest.



study by **R. A. Olson** and **A. F. Dreier**.

NITROGEN LOSS

Fertilizer nitrogen is taken out of circulation by soil organisms much faster than by growing crops. However, if conditions in the soil are favorable, it is also released very rapidly by the organisms.

Even when fertilizer nitrogen has been recently applied to the soil, the nitrogen which feeds plants is partly reduced by soil organisms, according to a paper presented by **B. J. Stojanovic** and **F. E. Broadbent** and covered studies on two New York soils. Stojanovic is an agronomist

at Cornell University, Ithaca, N. Y. Broadbent, a former member of the Cornell staff, is now with the University of California at Davis.

SPEEDS TREES

Use of nitrogen fertilizer on a 30-year old Douglas fir stand resulted in accelerated diameter growth, particularly in larger diameter trees, **S. P. Gessel** and **Abdulla Shareeff** of the University of Washington said.

The nitrogen was applied at an initial rate of 100 pounds per acre. Later applications over a 5-year period brought the total application to 350 pounds.

Kirk Lawton and **J. F. Davis** of the station staff described this effect.

PLANTS WORK FOR LIME

Plants grown on soils abundantly supplied with calcium carbonate (limestone) often do not take up calcium to as great an extent as plants on non-calcareous (low lime) soils, **W. H. Fuller** and **W. J. Flocker** of the University of Arizona said that acid (low lime) soils from the humid forest region of the U. S. Midwest supplied as much calcium to plants as some Arizona soils high in calcium carbonate. Their report was based upon experimental work at Tucson, Arizona.

MOLYBDENUM DEFICIENCIES

Field deficiencies of the element molybdenum occur locally throughout eastern United States and Canada, along the Gulf Coast, and in the Pacific Northwest.

Legumes, tomatoes, lettuce, beets, spinach, crucifers, and cucurbits are the crops chiefly affected, **Charles H. Kline** of the Climax Molybdenum Company said. Deficiencies of total molybdenum in U. S. soils are relatively few, Kline reported. However, deficiencies of available molybdenum are fairly common in acid-soil regions. Excesses of molybdenum occur on peat and muck soils and on poorly drained alkaline soils, especially in valley floors of the west.

SLUDGE HAS CHANGED

Growers who use sewage sludge as a fertilizer or for general soil improvement can well take a look at the yesterday and today of such products.

This reminder was offered to crop and soil specialists attending the annual meeting of the American Society of Agronomy by **M. S. Anderson**, senior chemist in the USDA Soil and Water Conservation Research Branch, Beltsville, Md.

"Materials now entering our sewers are often of higher phosphate content than those of some 15 years ago," Anderson indicated, in a paper delivered this afternoon. "The intake of modern detergents and other cleaning materials, together with ground bones and waste vegetable parts from home garbage grinders, is often reflected in the analysis of final products."

Modern sewage disposal plants fall into two general classes; those producing activated, well-aerated sludge and those using long digestion in the absence of air, the USDA chemist said. In spite of many variations in the routing of sewage through a dis-

PHOSPHORUS

CAN CROPS GET IT?

A soil sample may have a rather large amount of phosphorus in it, but whether crops can get at the phosphorus and make use of it is very much effected by the extent to which the soil has been weathered and the vertical position of the soil sample in the profile.

C. L. Godfrey of Texas A & M College and **F. F. Ricken** of Iowa State College made this point in a paper based upon a research study at Ames, Iowa.

CARBON RELATIONSHIP

A relationship between carbon and phosphorus in the soil somewhat like that which exists between carbon and nitrogen has been uncovered by three Arizona soil scientists.

The nitrogen starvation which results when too much straw, sawdust, or other carbon-containing material is added to the soil is well known to farmers. The Arizona work suggests that farm crops suffer a somewhat similar starvation for phosphorus when too much carbonaceous material is added to the soil.

W. H. Fuller, **D. R. Nielsen**, and **R. W. Miller** of the University of Arizona reported on this.

GRASS NEEDS BOTH

A combination of both nitrogen and phosphorus is needed for grass establishment on many eroded and abandoned soils in the southern Great Plains, said **L. F. Thompson** and **R. A. Chessmore**, in a paper which told of preliminary results in greenhouse and field experiments at Ardmore, Oklahoma. Both men are staff members of the Samuel Roberts Noble Foundation there.

TOO MUCH PHOSPHORUS

An oversupply of phosphorus may interfere with the soil's ability to supply citrus trees with such minor elements as copper and zinc.

This was the report given by two staff members of the Citrus Experiment Station, Riverside, Calif. The two are **Frank T. Bingham** and **James P. Martin**.

USE IN CROP YEAR

Canning peas gave their best response to fertilizer phosphorus when it was applied during the current cropping year, rather than one or two years previously, **J. L. Haddock** and **D. C. Linton** of Utah State Agricultural College said.

Miscellaneous Elements

ALUNITE NOT ANSWER

Alunite, sometimes thought of as a possible source of potash fertilizer, has turned out to be rather useless for that purpose on a potassium-deficient soil in northern California.

W. E. Martin and **James Vlamis** of the University of California reported this finding.

LIME CAN LOWER PHOSPHORUS

Lime applications reduce the phosphorus content of crops grown on strongly acid organic soils to the point where phosphorus deficiencies may occur, unless an available form of phosphate fertilizer is added, work at Michigan State College indicates.

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positional plant, a farmer should recognize a wide difference in the fertilizer value of sludge from the two classes of plants.

In the terms used by the fertilizer trade, dried activated sludge often corresponds approximately to the grade 5.5-5.0-0.4. The quality of the nitrogen is good, approximating that of the nitrogen in cottonseed meal. Digested sludges are variable in

composition, often of a grade about 2.4-2.3-0.3. The nitrogen is slowly available, comparable to that in average barnyard manure.

Either type of sludge, when heat-sterilized, Anderson pointed out, may be used for direct application to soil or may be mixed with other materials, as in forming a fertilizer suitable for use when growing tobacco.

COVER CROPS

EQUALS TON

The amount of plant food in a well-grown cover crop is equivalent per acre to a ton of high-grade fertilizer, a representative of the Seabrook Farming Corporation at Bridgeton, N. J., told the meeting.

Frank App, director of research and development for the corporation, made this report in a paper prepared by himself, Vernon Ichisaki, and Tejpal S. Gill.

CLOVER REPLACES MANURE

Sweet clover not only took the place of stable manure but outperformed it as well when the legume was used as a green manure crop on a Michigan soil, three soil scientists J. R. Guttay, R. L. Cook, and A. E. Erickson of Michigan State University reported here today.

They based their report on yield increases obtained on five navy bean crops, two corn crops, two sugar beet crops and eight small grain crops.

CORN EATS ALFALFA

Almost one-fourth of the nitrogen

in freshly cut alfalfa turned under as green manure was recovered by a corn crop the same season at Ames, Iowa.

From freshly cut alfalfa and red clover tops, about 24 and 7 percent, respectively, of the nitrogen was recovered in a corn crop the first season, H. A. Fribourg and W. V. Bartholomew told soil scientists attending the meeting. The following season only about 6 and 3 percent, respectively, of the nitrogen became available and was recovered in a crop of oats.

LEGUMES IN THE CORN

Interplanting legumes in corn has resulted in an increase in corn yields, according to results of a 4-year study in Mexico.

The study was described by J. B. Pitner and R. P. Peregrina. The experiments upon which these results are based were conducted under the auspices of the Office of Special Studies, a research agency of the Mexican Ministry of Agriculture, in which the Rockefeller Foundation collaborates.

GRASS

RESEARCH SCANTY

Despite their importance to us, our vast areas of grasslands are largely neglected acres, W. M. Myers, head of the Department of Agronomy at the University of Minnesota, pointed out at a grasslands session.

Only a small proportion has been improved, even to the extent possible with existing knowledge and plant materials, Myers told his audience. But particularly, he emphasized, they are neglected acres from the standpoint of our research programs.

RESEARCH EFFECTIVE

Improvement practices developed in recent years through sound re-

search programs show promise for considerably increased pasture production as well as more efficiency and stability of production in the humid Eastern states, R. E. Wagner, of the USDA Field Crops Research Branch at Beltsville, Md. pointed out.

HOLD IDENTITY

A need for more careful programs to maintain the identity of many outstanding turfgrasses was pointed out by Wayne W. Huffine of the Oklahoma Agricultural Experiment Station.

LESS DISEASE

The grasses and legumes of tomorrow will have more resistance to disease if crop breeders have their

way. This was the report made to crop specialists attending a forage crop improvement symposium by Glenn W. Burton of Tifton, Ga.

Burton said that much forage plant breeding today is concerned with increasing disease resistance. Since disease affects both the quantity and the quality of the forage, developing resistant varieties may be expected to increase the yields of digestive nutrients. It will also add stability and permanence to grassland agriculture by minimizing seasonal hazards due to disease.

SEED DEGENERATED

The yield advantage of Kenland red clover under Indiana conditions was reduced when seed for plantings in Indiana was produced several generations removed from breeders seed, R. L. Davis and K. E. Beeson of Purdue University reported.

Their report was based on a comparison of 49 different lots of Kenland clover grown in 1954 at Purdue University, in cooperation with the USDA.

BETTER THAN BLUE

Orchard grass and Ladino clover were more productive in terms of beef cattle gains than mixtures of Kentucky bluegrass and white clover or tall fescue and Ladino clover, a 5-year Maryland comparison has shown.

This report was presented by T. S. Ronningen of the University of Maryland.

WATCH THERMOMETER

Frequency of killing by low temperature and by disease are the two critical factors which determine the persistence of Ladino clover in pasture stands, at least under conditions found in Rhode Island.

Irene H. Stuckey, a member of the Rhode Island Agricultural Experiment Station staff, made this assertion. She called management of less importance than the above factors in maintaining permanent stands of the legume.

BALANCE NPK

Nitrogen, phosphoric acid, and potash must be kept in proper balance with each other for best turf production, E. C. Holt and J. E. Adams of the Texas Agricultural Experiment Station have concluded, on the basis of 3-year studies at College Station, Texas.

GRASS COMPETES

Nitrogen applications to pure grass stands more than double forage production in experiments at College

Park, Md., but the same amount of nitrogen on a good grass-legume mixture gave a much smaller increase, a University of Maryland pasture specialist, **A. Morris Decker** reported. Where nitrogen was used on grass-legume mixtures, the added yield was supplied by the grass portion of the mixture. In most instances, the grass was so competitive that it substantially reduced the clover stands.

N INCREASED SEEDS

Nitrogen was a major factor in increasing seed yields from four common grasses in 1952 and 1953 comparisons at State College, Pa., the first 50 pounds of nitrogen applied per acre giving the largest increases in yield.

This fact was reported by **R. E. Buller**, an assistant agronomist with the Rockefeller Foundation. His statement was based upon a research study at Pennsylvania State College by himself, **J. S. Bubar**, **H. R. Fortmann**, and **H. L. Carnahan**.

The importance of making a right choice of grasses and legumes for winter grazing use was emphasized by pasture specialist **F. P. Gardner**, formerly of the University of Georgia and now at Ohio State University.

Since late fall and winter are generally considered to be critical periods in grazing program, Gardner indicated, utilization of vigorous fall growing species and varieties to

produce forage that could be utilized during these periods appears highly important.

GRASS GROWS MEAT

Winter-Spring pastures in Georgia are demonstrating a surprising ability to support high production rates of milk, beef, and lamb, according to grazing trials at Experiment, Ga. it was reported by **O. E. Soll**, **M. E. McCullough**, and **D. M. Baird** of the Georgia Experiment Station.

They attributed the value of winter-spring pastures as to the high digestibility of forage from these pastures and to the high rates of consumption of forage during these periods.

ALFALFA WAS BEST

Alfalfa was the best legume contributor to irrigated pasture yields when used in mixtures with grasses in 1952 comparisons at North Logan, Utah, according to a report by **Angus H. Hyer** and **William H. Bennett** of Utah State Agricultural College.

ALFALFA LIKES LIME

Excellent crops of alfalfa were produced on a limed soil typical of the extreme southeast portion of Oklahoma when soil fertility requirements were met, **H. F. Murphy** and **J. Q. Lynd** of Oklahoma A & M College said, describing 1951, 1952, and 1953 experiments conducted under auspices of the Oklahoma Agricultural Experiment Station.

one-fifth pint per gallon, respectively, according to Rea, greatly increased the effectiveness of the oil.

NEW KILLERS

Two new types of selective weed killers look quite promising for control of numerous annual grass and broadleaved weeds, without injury to corn, beans, onions, and various members of the cabbage family, according to preliminary results from 2 years of tests at Oregon State College.

The weed killers belong to two different groups of chemicals, chloroacetamides and thio-carbamates, **William R. Furtick** of the college staff reported. Both are experimental chemicals produced by Monsanto Chemical Company, St. Louis.

DODDER CONTROL

A chemical weed killer, CIPC, has given good to excellent control of dodder in alfalfa seed crops in Utah, according to **W. O. Lee** and **F. L. Timmons**, two USDA scientists working in cooperation with the Utah Agricultural Experiment Station.

Pre-emergence sprays of CIPC (isopropyl N-(3-chlorophenyl)-carbamate, at rates of 3, 6, and 9 pounds per acre just as the alfalfa was beginning growth early in April, gave 100 per cent control in the cool, wet spring of 1953 and increased alfalfa seed yields 60 to 75 percent.

CITRUS PESTS

A somewhat less favorable response from two bromide-containing fumigants than from other fumigants used to control soil pests prior to replanting citrus was described by **J. P. Martin**, **G. K. Helmkamp**, and **J. O. Ervin** of the California Citrus Experiment Station who said that soil formation for control of nematodes and other organisms before replanting citrus is becoming a common practice in California. They pointed to limitations of ethylene dibromide and methyl bromide for this purpose.

DINITRO WORKS

A dinitro weed killer has given good results in eliminating annual weeds from new seedlings of orchard grass-Ladino clover at Mt. Vernon, Wash., two Northwestern Washington Experiment Station workers, **Dwight V. Peabody, Jr.**, and **Corwin M. Johnson**, told their listeners. The chemical was the alkanolamine salt of dinitroortho-secondary butylphenol.

NO HARM IN THEM

None of three fungicides commonly used in treating alfalfa seed

CROP CHEMICALS

LAWS NOT ANSWER

An arbitrary curtailment of the use of herbicides through legislation is not the answer to the problem of crop injury resulting from their careless use, a representative of the National Agricultural Chemicals Association, **Jack Dreessen**, herbicide specialist for the association emphasized.

It would be more desirable, he said, to encourage more farmers to support a sound program of farm practices based on available information which has been carefully worked out from research data.

WETTING AGENTS

A preference for what are known as "non-ionic" wetting agents in agricultural sprays was expressed by two members of the New Jersey Agricultural Experiment Station, New Brunswick, N. J., **K. Ivarson** and **D. Pramer**. Since non-ionic wetting agents are the most readily broken

down in soil and the least toxic to soil bacteria, their use is preferred. However, little difficulty will be encountered with any of the common wetting agents if these are used at low levels.

COTTON WEEDS

Various kinds of weedkillers have been useful in ridding cotton fields of second-growth Johnson grass, **H. E. Rea**, Texas A & M College, reported.

Oiling the crowns of second-growth Johnson grass was used to control scattered infestations in 1500 acres of cotton at McGregor, Tex., and in 491 acres at College Station, Tex., in 1954, Rea said. Oil and labor cost \$2.35 per acre per application. Six oilings of the grass in a heavily infested field at College Station cost \$14.10 per acre and eradicated 97 percent of the treated spots.

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had any injurious or beneficial affect on seedling establishment of the crop on calcareous soils in Utah, according to a Utah State College study, by **R. B. Foster, D. R. McAllister, and M. W. Pedersen.**

CONDITIONERS

Parker F. Pratt, formerly with Ohio State University and now located at the Citrus Experiment Station, Riverside, Calif., and **Milton Jones** of Ohio State University described laboratory experiments on soils treated with soil conditioners IBMA and HPAN. They said that on some of these treated soils, there was less fixation of potassium into unavailable forms than in nontreated soils.

When potassium fertilizers were added with conditioners, more remained available than when the conditioners were not added.

BEETS BEAT NEMATODE

A clue which plant breeders may be able to use in developing sugar beet strains resistant to the sugar beet nematode has been reported by two staff members of the American Crystal Sugar Company. **R. E. Finkner** and **J. F. Swink**, Rocky Ford, Colo., said they had found a relationship between the content of a certain type of carbohydrate in sugar beets and their susceptibility to the "beet sickness" caused by the nematode.

RESEARCH RESULTS AND REPORTS

Potash was the subject of the first US patent ever granted. It went to Samuel Hopkins in 1790, signed by George Washington. 50 years ago only 3% of patents were chemical in nature; now it's 20%.

Fruit tree diet is being checked with metallurgy techniques. The spectograph shows the food in the leaves, according to Dr. H. B. Tukey, Michigan State.

Piped fertilizer is being tested by Lester Pfister, hybrid corn breeder in El Paso, Ill. He's testing, with control plots, running in tile lines, some of which will bring only water, some water and liquid fertilizer, some . . . no tile, but ditched to the same 36" depth and fed, some water, some water and fertilizer.

Exact measure of available phosphate in any soil can be accurately expressed in terms of superphosphate equivalent per acre. USDA soil men have worked out an application of radioactive phosphorus which will do it. They are Maurice Fried and L. A. Dean at Beltsville.

Deep application, 14 to 16 inches below surface grew taller corn with deeper roots for Drs. W. K. Robertson and J. G. A. Fiskell, at the Florida AES, Gainesville.

Broadcasting best, say Texas AES workers in Bulletin 805. They find that on perennial pasture tillage

favors growth of ragweed and is no help to the pasture. Putting fertilizer below the surface just disturbs the roots, they say.

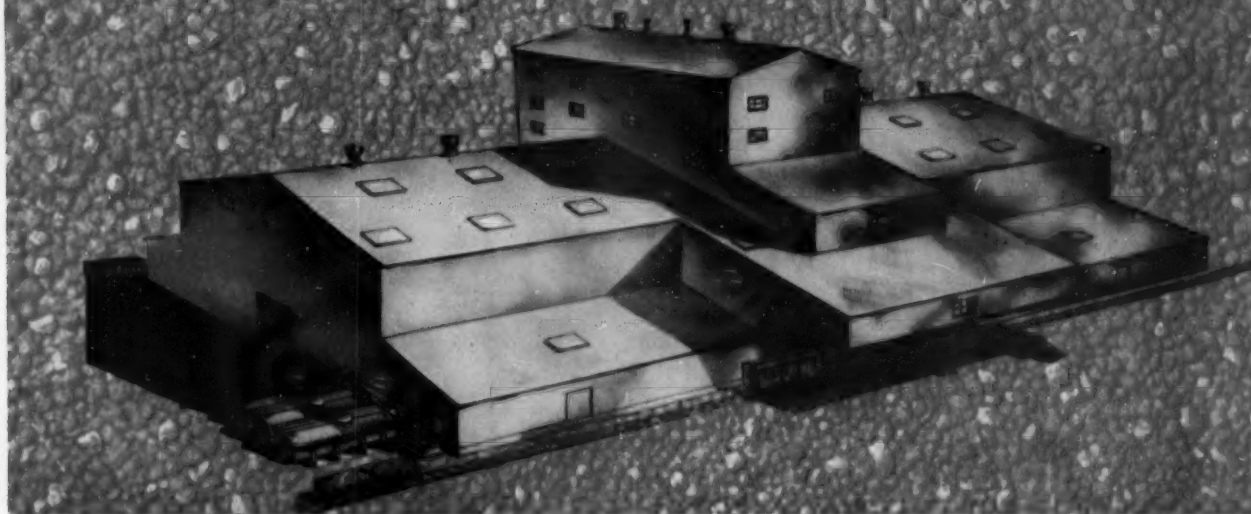
N & P is needed by dryland pastures. The Texas bulletin says so, and so does the Hopland Field Station, U of Cal.—according to a CFA bulletin that says N&P jumped forage ten times over unfertilized fields. 16-20-0 did the best job, they report.

Microclimate is a ten-buck word to describe USDA's newest study of the "climate" down there where the plants grow, the "atmospheric environment" near the ground surface. Agronomist V. G. Sprague and his associates at Pasture Lab, Beltsville, feel that ground-level climatology may bring up yields and profits on forage crops.

Super-hay, which is too high in protein for a basic cattle ration is nevertheless interesting to Western ranchers because it grows readily, and can be used as a supplement economically. USDA and Colorado AES proved Super-hay as efficient in producing beef cattle gains as commercial protein supplements, in cooperative tests.

Granular insecticides show promise for control of European corn borers, cooperative USDA and Iowa State experiments indicate. Granular form of DDT, EPN and heptachlor shows good to better results than sprays of the same.

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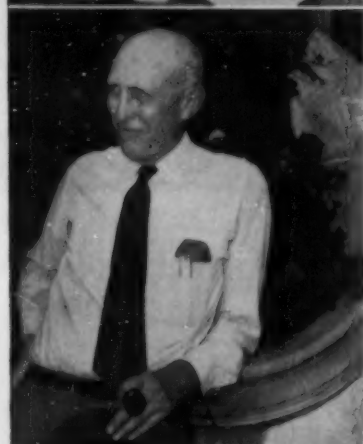
Architects and Manufacturing Engineers to the fertilizer industry since 1927

WE VISITED **BELTSVILLE**



If you talk with Robert M. Salter, Chief, Soil and Water Research Conservation Branch, he will tell you that his work in Beltsville is mostly administrative, that most of the activities of this branch are everywhere, except Beltsville. Which does not underestimate the many activities under way at Beltsville, just scales them down to size in relation to the whole.

The Soil and Water Conservation Research Branch constitutes the research program of the ARS in the field of soils, water, fertilizers, and hydrology of agricultural watersheds; the Branch conducts its research in cooperation with state agricultural experiment stations. Other local, state or federal agencies also cooperate with the Branch.



Here's a man everybody knows, K. D. Jacob, Head, Fertilizer and Agricultural Lime Section, Soil and Water Conservation Research Branch, ARS of USDA. "Jake," as his friends call him, was our guide during a visit to Beltsville, and paused a moment for this snapshot at completion of our "tour". Work in the Section Mr. Jacob heads involves research on preparation, technology, and use of fertilizers and liming materials and soil amendments; development of methods and standards for analysis of fertilizers and liming materials; and compilation of statistics on consumption of all types of fertilizer materials and mixtures.



Cecil Wadleigh, who heads the Soils and Plant Relationships Section, also directs the U. S. Soil Research Laboratory at Beltsville. The work of this Section is principally of a laboratory and greenhouse nature to determine basic principles of soil moisture, fertility and salinity in relation to yields and nutrient quality of crops. Investigations of the chemical, physical, and microbiological properties of soil, the quality of irrigation waters, and effects of soil conditions on composition of plants in relation to nutritional problems of plants, animals, and man are carried on under Dr. Wadleigh's supervision at the Beltsville Laboratory, the U. S. Salinity Laboratory, Riverside, California, and the U. S. Plant, Soil, and Nutrition Laboratory, Ithaca, New York.



Lewis B. Nelson, Head, Eastern Soil and Water Management Section, has charge of investigations in soil and crop management and water management on farms related to crop production—the research planned and conducted cooperatively with state agricultural experiment stations. Field, greenhouse, and laboratory investigations covering many phases of cultural practices are used as a basis for evolving agricultural systems capable of maintaining or raising the level of soil productivity in the humid regions.

You can select a title for an article like "A Visit to Beltsville" which is clear and to the point. But if you have visited Beltsville, it's not so clear; but vast, complex, endless. It is a tremendous place where all kinds of agricultural projects come to a focus, or are under way.

That old phrase "like watching a three ring circus," which really means trying to keep an eye on an impossible number of activities, would more accurately describe it—if it were brought up to date (any circus today worth its salt has at least five rings). And so it is with the multiple activities at Beltsville.

Our visit concerned itself with only one branch of Beltsville's far-flung operations—the Soil and Water Conservation Research Branch of ARS under which five sections operate; Fertilizer and Agricultural Lime; Eastern Soil and Water Management, Western Soil and Water Management; Soils and Plant Relationships; Watershed Hydrology. But it all covers a lot of territory.

It is difficult (some say impossible) to boil down research to a few sentences and still say anything; or to summarize research, it encompasses so many activities on such a broad and continuing scale that there seems to be no real beginning or end.

For instance, in talking with Dr. Cecil Wadleigh who heads the Soils and Plant Relationships Section, he spoke of two widely separated projects, just two of many and varied projects, each presenting baffling problems to be solved. One project is under way to determine the "why" of **highest** nutritional qualities found in turnipgreens grown in the area of Blairsville, Ga., and **lowest** found in turnipgreens grown in Experiment, Ga., not more than 100 miles away. Another project is under way to discover the "why" of a nutritional deficiency that is the direct cause of malformed lambs born of sheep that graze on a certain rangeland in the Rockies.

And so it goes. Project after project. To find out "why".

Our presentation of Beltsville here will not supply the "answers"; but it will serve to introduce some of our industry's good friends to those who have not met them, and to remind those who do know them of the fine work they are doing for agriculture, and for us.

COMMERCIAL FERTILIZER



Administration Building



Soils Building

Lewis W. Erdman of Soils and Plant Relationships Section studies the effects of withholding nitrogen from soybeans and sweet clover. The stunted yellow plants in the second and fourth jars from the left existed up to this stage on the nitrogen stored in the seeds. The soybeans in the first jar and the sweet clover in the third jar got sufficient nitrogen to make this difference in growth and dark green color.



Here soil scientist Dr. Maurice Fried examines the growth of alfalfa plants in a rock phosphate comparison. The objective of this study was a comparison of various sources of phosphate rock as a direct soil fertilizer. These sources include among the domestic sources the western rocks, the Tennessee rock, the Florida pebble and the South Carolina rock. They also include such foreign sources as Tunisian rock, Curacao, and Morocco rock. Particle size comparisons are also being made. Other experiments comparing superphosphate and rock phosphate are in progress using radioactive phosphorus tracers to better evaluate the agricultural value of the materials.

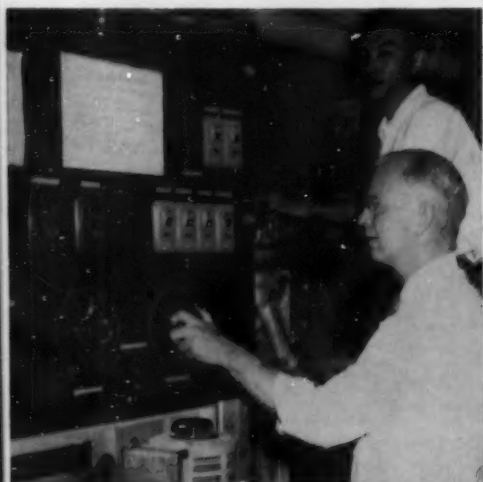


Here chemist R. S. Holmes shows us some of the results of studies on iron chlorosis. The plants were all grown on a Millville, calcareous soil. The ones in the foreground are typically chlorotic. Those in the background have received various rates of a chelate. A chelate is a complex organic molecule which complexes the iron in the soil and makes it available to the plants. When as little as fifty pounds per acre were added to the soil, the plants grew normally. On some tests the chelates contained radioactive iron; in others the radio-activity was in the carbon of the carboxyl group of the chelate molecule. This provided a means of studying both the availability from the soil and distribution in the plant of both the iron and chelate.

The distribution of radio iron and carbon was determined in the plant by radio-autograph. The total activity in the soil and plants was measured by counting the radio-activity in a proportional counter



Here are names familiar to fertilizer industry folks—Hilda M. Wallace, Esther I. Fox and Walter Scholl. And indeed they should be for they by-line the industry's yearly fertilizer consumption reports containing information of much interest and value to the fertilizer industry. Each year, Commercial Fertilizer publishes this material as soon as it is released and republishes it in the Year Book as a ready, and permanent, reference for industry members.



Above: John Hardesty, Senior Chemist, and Rikio Kumagai, Associate Chemical Engineer, explain the need for process control in research work under way at the continuous small-scale granulation plant at Beltsville. The pilot plant, shown in detail in the larger photo, is located on the ground floor of the building occupied by the Fertilizer and Agricultural Lime Section.

Honor Donald F. Jones At Station Field Day

The men who helped to write the opening chapters in the dramatic story of hybrid corn were honored August 16 at the annual field day of The Connecticut Agricultural Experiment Station at Mt. Carmel.

Dr. Donald F. Jones, in whose personal honor the day was named, and about 800 guests of the Station heard Henry A. Wallace, Secretary of Agriculture from 1933 to 1941, tell of his association with Dr. Jones for the past 36 years, and of the remarkable scientific contributions of men on the staff of this institution at the turn of the century and thereafter.

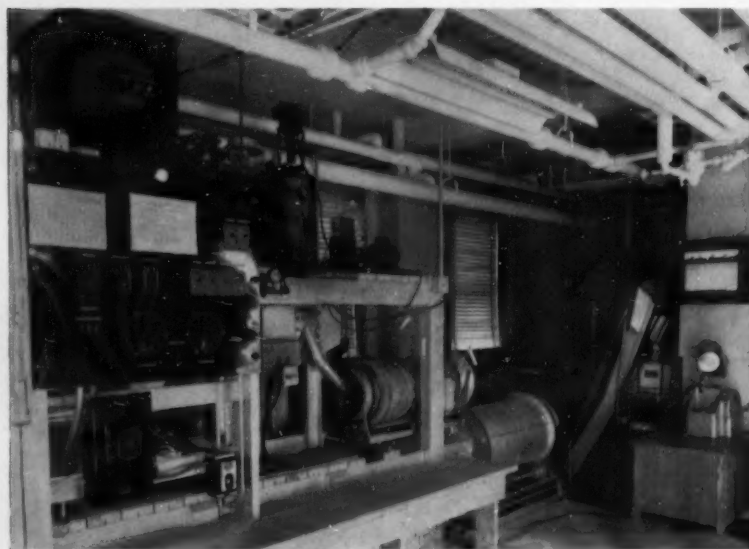
John T. Moss, Branford, presented for the Connecticut Seed Trade Association a bronze historical marker to show that double-cross hybrid corn was first grown by Dr. Jones at Mt. Carmel in 1917. Mr. Moss is president of the association.



Below: Agglomeration is receiving much attention as a chemical engineering unit operation in the manufacture of granular, high-analysis mixed fertilizers. At present about 80 of some 1200 fertilizer mixing plants in the United States have been converted to the granulation procedure. This trend started about 5 years ago and continues throughout the country. Long before that, in 1930, the fertilizer section in the Dept. of Agriculture developed the agglomeration technique for granulation, and advocated its use to minimize caking, segregation, dustiness and poor drillability in mixed fertilizers.

Present research in the Fertilizer and Agricultural Lime Section involves fundamental studies of the moisture and temperature relationships in the process with the object of furnishing basic information on the processing of present-day high-analysis mixtures of improved physical condition. Small-scale equipment for continuous granulation of mixtures has been installed at the Beltsville Laboratory which is useful in obtaining basic data for pilot- and plant-scale operations. Products obtained from this processing equipment are being subjected to bag-storage and drillability tests under field conditions in order to make sure that they are of such quality that they can be distributed satisfactorily on the land.

Throughout the course of this work close contact and active cooperation has been maintained with industry associations, companies, and individuals, as well as Federal, State, and private agencies interested in developments connected with the processing of fertilizers. Such cooperation contributes to advances in fertilizer technology and to the progress of the fertilizer industry in supplying the American farmer with high-quality products.



Coleman On 500 Radio Stations

Dr. Russell Coleman, Executive Vice President of the National Plant Food Institute, has completed a recording for the Board of Trade of the City of Chicago, to be used by approximately 500 radio stations on the subject of "The Efficient Use of Fertilizer."

The interview was made by Mel

Galliard. The program included a discussion on the role of fertilizer in efficient agricultural production, the importance of soil testing, the plant food supply outlook, and the return per dollar invested in fertilizers.

The broadcast will be heard during the Fall.

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HOW *Leaf Analysis* IS USED

From The August Issue
of USDA's "Agricultural Research"

**Analysis technique is helping scientists
find answers to citrus and tung problems**

1. Effects of different nutrient solutions are measured by leaf analysis of these citrus trees planted in sand. Fertilizer recommendations have come from similar plot studies. Such sand cultures are valuable in nutrition research—they give prevailing soil temperatures and good drainage, allow good root development.



2. Leaf analysis has helped show that soil acidity—not type of nitrogen fertilizer—is most important. Well-developed roots (left) were grown in slightly acid (pH 6) nutrient solution with ammonium source of nitrogen. Skippy roots developed with long-favored nitrate source of nitrogen, but in more acid (pH 4) solution.



3. Is potassium the only factor in fruit size? These sand-grown Valencias will be fed constant levels of potassium, but different levels of calcium and magnesium. Analysis has shown that when potassium levels are high, calcium and magnesium tend to be low. Scientists think it's really calcium that controls size.



Better than any research tool, leaf analysis reveals the inside story on plant nutrition.

In Florida, USDA citrus and tung scientists credit leaf analysis with an essential role in:

1. Boosting Florida's average citrus yield to 350 boxes per acre, compared to 150 boxes 20 years ago.

2. Developing tung from a new plant introduction (1905) into a crop worth as high as \$10 million a year.

Leaf analysis provides vital information for general citrus and tung fertilization recommendations. Big citrus producers use leaf analysis to answer hidden nutritional problems and to help produce fruit for a specific market. Through leaf analysis, tung researchers have been able to correlate leaf appearances with nutritional deficiencies in the orchards.

Now, ARS scientists at the U. S. Horticultural Field Station, Orlando, Fla., are using leaf analysis in studies of such things as soil acidity (pH) and nitrogen source and their effects on nutrient use by citrus. At the Tung Research Laboratory, Gainesville, leaf analysis is determining tree needs for such minor elements as boron and molybdenum.

For these scientists, leaves have had most of the answers for efficient, high production. Leaves are not only food factories where chemicals become growth factors but are also a tree's reservoir for nutrient minerals.

4. Tung trees set last spring in these plastic, sand-filled wastebaskets will be 4 to 6 feet high this fall. Scientists are altering nutrient solutions fed this year in an effort to determine calcium and boron requirements in terms of the type of nitrogen fertilizer used. Leaf analysis will help provide answers.



Being able to "look into" these leaves has enabled the researchers to establish in only a few years an understanding of nutrient needs that would have taken decades with fertilizer trials and soil analysis.

Leaf analysis has world-wide significance. In any country where citrus or tung research has lagged, leaf analysis (interpreted in terms of research in Florida) could show deficiencies, and corrective fertilization could be recommended. Equally important, leaf analysis could rule out nutritional deficiency as a reason for poor growth if some other factor—for example, disease or soil management—was to blame.

By growing citrus and tung in sand or water to which all nutrients are added, then analyzing the leaves for these nutrients, researchers have established optimum levels for all important elements. By changing this nutrient balance, the scientists have learned about the interrelationship among the elements.

Twenty years ago, Florida citrus growers largely confined groves to the "better" heavy soils, using a fertilizer that included 3 percent nitrogen, 8 percent phosphate, 8 percent potash, 2 percent magnesium oxide, 1 percent manganese oxide, and ½ percent copper oxide. Knowledge gained through leaf analysis has allowed extension of citrus groves to lighter soils. And fertilizers have been modified until growers now use a formula that contains nearly three times as much nitrogen (8 percent), no phosphorus, the same amount of potash, more magnesium oxide (3 percent), and no manganese or copper.

Leaf and rootlet analysis has enabled growers to correct copper toxicity by liming heavily (lime immobilizes copper; this, in turn, frees roots to absorb other nutrients). Researchers have found that calcium and magnesium deficiencies can be induced by applying too much potassium. And trees showing low levels of phosphorus, sulfur, or potassium may be getting too much nitrogen.

COMMERCIAL FERTILIZER



1. The value of leaf analysis depends upon standardization of leaf-sampling methods. Here, P. F. Smith selects those citrus leaves that were produced in the spring, lying behind the summer flush of growth. Leaves are taken one from a twig from several branches of each tree. These branches are fruitless or non-bearing.

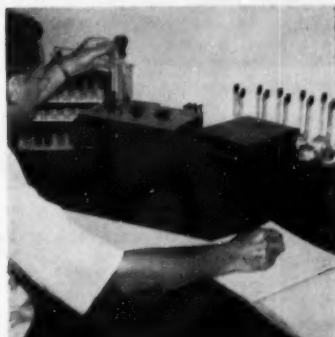
3. Leaves are ground and dried to a constant moisture level in this 63° C. oven—an overnight operation—in preparation for further processing. The leaf analysis technique is being used by citrus growers to solve hidden nutritional problems, by tung scientists in correlating leaf appearance with nutritional deficiencies.



5. Weighed samples are reduced to ash in this 500° C. oven. The sample in each crucible will eventually reveal nutritional information about an entire experimental plot of citrus trees. Researchers can analyze 500 samples (representing as many orchards or research plots) a year, determining 5 to 10 elements per sample.



7. Color spectrophotometer is used to analyze acid solutions of ashed leaf samples for their content of nitrogen, phosphorus, copper, zinc, manganese, boron, and iron. This apparatus measures the color intensity of an indicator solution. These measurements are recorded and translated into percentages of each element.



2. A routine washing of citrus leaf samples in detergent, then rinsing and drying, removes the dust and chemical residues in the first step of preparing a leaf analysis sample. The job is done here by biological aid G. Hrciar at the U. S. Horticultural Field Station, Orlando. About 40 leaves make up a good sample.

4. Ground and dried citrus leaf samples are carefully weighed out by the researcher. Amount varies with the type of test: 200 milligrams (above 1/142 ounce) for samples to be analyzed on flame photometer (see No. 6) for one group of elements, 100 mg. for samples to be tested colorimetrically (see No. 7) for another group.



6. Acid solutions of ashed leaf are analyzed on flame photometer to find amounts of potassium, calcium, magnesium, sodium. Air pressure atomizes the solution through jet into a hydrogen flame. Wave lengths from hot vapor are picked up by quartz prism, electrically translated into a quantitative measure of the element.



8. At the Gainesville tung laboratory, chemist H. L. Barrows uses polarograph in improved technique to determine zinc and manganese in only 5 to 10 minutes. Acid solution of ashed leaf is put between positive and negative electrical conductors of mercury. Current's flow through solution quantitatively measures element.



In developing tung, researchers have been able to recommend heavier nitrogen and potassium and lighter phosphorus fertilization and to include such minor elements as copper, magnesium, zinc, and manganese.

Currently, leaf analysis is being used by plant physiologist P. F. Smith at Orlando to determine the effect of different soil acidities on nutrient uptake by citrus roots.

Thus far, Smith has disproved the common belief that citrus cannot make use of nitrogen supplied as ammonia rather than as nitrates. By maintaining nutrient solutions in the pH 7 to 6 range (neutral to slightly acid), he has been able to get citrus to prosper as well on one source of nitrogen as the other.

Through leaf analysis, he has shown that nitrogen is readily taken up from ammonia sources even when the pH is 4 (moderately acid). But the presence of this form of nitrogen plus the hydrogen ions in the nutrient solution interfered with the plant's uptake of two other essential elements—potassium and magnesium. Chemically, the ammonium cation competed so well that only limited numbers of the potassium and magnesium cations were absorbed by the roots. This very problem of cation competition results in low potassium in California citrus groves that are high in calcium.

The day may soon arrive when more growers will regularly look to commercial leaf analysis service to provide information they need in planning their fertilization programs.

With some of these crops—tung, for example—an observant grower may be able to get information he needs for corrective fertilization by comparing certain visible deficiency symptoms on tree foliage with the knowledge of such symptoms gained through leaf analysis. In other instances, however, these symptoms may be concealed or made unrecognizable by the level of other elements in the leaves or by other abnormal grove conditions. With most tree crops, visible symptoms may appear only after several years of nutritional deficiency—a period that may otherwise be marked with below-normal yields of fruit.

IM&C Moves Atlanta Office

District offices of International Minerals & Chemical Corp., for many years located in the Mortgage Guarantee Building in Atlanta, Ga., moved on August 1st to 1325 Fulton National Bank Bldg.

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We also offer One-Stop Service—which means you can contract for your nitrogen requirements from a single dependable source, saving you time (which, these days, is money!). As for *quality*, you can build your own reputation on a solid basis when you depend on Lion quality.

And when you need assistance with a formulation problem, our skilled Lion technical staff is ready to help you.

Our great storage facilities and the variety and flexibility of our manufacturing operations assure you of prompt shipment.

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ARIZONA

Southwest Agrochemical Corp., Chandler will start November 1 construction of the \$2,500,000 fertilizer plant on a 48 acre tract they have bought, which we reported last month. The company is almost 100% Arizona-owned, with 35 prominent farmers as shareholders. **Clyde Willson**, chairman, is present president of the Arizona Cotton Growers Association and his ACGA predecessor, **Cecil H. Collierette**, is a director of the new company. **Fred Lauer Jr.**, vice-president is plant designer and general manager.

Initial output will be 25 daily tons of anhydrous, leading to the daily 100 ton production in the future which we have already reported.

ARKANSAS

Delta Butane Gas & Fertilizer Company, Helena, has opened at its new location, 605 Walnut Street.

CALIFORNIA

...**Brea Chemicals**, Brea, is building a 200 foot prilling tower for the production of ammonium nitrate pellets, a unit to cost more than \$1,000,000. They will shortly be ready to put into production the 50,000 annual ton prilled ammonium nitrate plant at Wilmington. Brea is now producing 100,000 annual tons of anhydrous ammonia, with reserve capacity for another 50,000 annual tons.

Shell Chemical begins direct selling to Western mixers of its ammonium sulfate middle of this month. Under Shell's brand, the product has been distributed by **Nitrogen Division** and **Producer Sales Corp.**

California Mor-Life Inc., owned by 10 Watsonville businessmen and growers, has gone into operation, making and marketing commercial fertilizers. **Philip E. Gunderson** is plant manager; **Stanley C. Sutherland** is salesmanager. A soil analysis laboratory is planned.

Wilbur-Ellis Co.'s plan to convert activated sludge from the Los Angeles disposal plant has gone to study by consultants employed by the Public Works Board. The Wilbur-Ellis contention is that a slight modification of the former venture in this direction can redeem it. Also it contends that 420,000,000 gallons of water can be reclaimed for reuse by industry or irrigation.

COLORADO

Commercial Fertilizer Development Co., Garland, are studying Walsenburg as a site for a fertilizer-insecticide plant, and expect to announce a decision first of next month.

Rico Argentine Mining Co., Rico, have hardly gotten their 200 daily ton sulphuric plant into production when the Atomic Energy Commission has asked them to double output. They have not yet decided whether or not to expand. The story back of the AEC's request being that the copper strike has cut off much sulphuric production and put the uranium people in a pinch.

FLORIDA

Wilson & Toomer Fertilizer, Jacksonville, produces both good and bad news this month. Fire caused considerable damage (\$5000 to \$10,000) at their **Florida Agricultural Supply** subsidiary, and three of their people were burned, one seriously.

The good news is that they and their advertising agency, **Newman, Lynde and Associates**, won an award for advertising excellence from the First Advertising Agency Group.

The **Bonnie** phosphate chemicals plant of **International Minerals & Chemical** near Bartow, Florida, was damaged by a dynamite bomb set off early Aug. 28, according to officials of the company.

The dynamiting took place on the ninetieth day of the strike by local

35 of the International Chemical Workers Union on which negotiations have been punctuated by other acts of violence.

During the strike period portions of the plant have continued in operation by members of the supervisory staff.

The dynamiting took place in the central control room of the sulphuric acid plant, one of the vital points of operation. Personal injury was avoided by the fact that members of the supervisory crew had not yet reported for duty.

Preliminary estimate of the damage is believed to be in excess of \$50,000 and approximately two months may be required to repair the damage, however, temporary repairs requiring a week to ten days were being made so that the plant could be operated.

Officials of the company offered a reward of \$5,000 for information leading to the arrest and conviction of persons responsible for the dynamiting.

IDAHO

Pacific Supply Cooperative has been granted a city permit to build an aqua ammonia plant, small now but leading to a big one later, according to officials. Smart public relations assured the community that there was neither fire hazard nor odor in the operation.

ILLINOIS

Crop Service Co., is building a liquid fertilizer mixing plant at Rising Station which will be, according to company manager **H. J. Schultz**, the largest liquid fertilizer plant in the US. They have branch bulk plants at Paxton and Onarga.

Darling & Company is installing a new granulating unit at their East Saint Louis, plant. Construction is well under way with operations planned for early Fall. The unit will have a high production capacity of closely sized material. The complete unit is being designed and furnished by the **D. M. Weatherly Company** of Atlanta, Ga.

INDIANA

Indiana Farm Bureau Cooperative has put into operation the new granulation unit at Indianapolis. **Ben Scharrer** is production manager; **Melvin Leach** is superintendent.

Davison Chemical have applied for a zoning ruling from the Board of Zoning Appeals, Elliott City, to permit them to build there the million



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LOWEST RAW MATERIAL COST

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- They stay on the designed capacity.
- They turn out a high quality, high volume, guaranteed production, using the lowest cost raw materials.
- They are built with the highest quality, heavy duty equipment.

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Progress in the construction of the new \$16,000,000 petrochemical plant on the banks of the Mississippi River at Selma, Missouri, by the Fluor Corp. of Los Angeles, Calif., is shown in this aerial view.

The new plant of the Mississippi River Chemical Company, a division of Mississippi River Fuel Corp., for the production of nitrogen products is rising on schedule for completion the first few days in October. Plant production is designed for 200 tons anhydrous ammonia a day and other facilities, including a 220-ton per day nitric acid unit, prilling plant, deep water wells, and storage facilities (not shown in photograph) are expected to start operating some weeks before. All the products of the new plant, ammonium nitrate fertilizer, nitrate solutions, and anhydrous ammonia for agricultural use will be marketed under the Missis-

sippi River Chemical Company's "STEAMBOAT BRAND" trademark. They will be distributed through regular fertilizer manufacturing channels by Bradley and Baker, national sales agents and representatives for leading producers of basic plant foods and feed ingredients and supplements.

Construction of the new plant was started last December, after a mammoth earth-moving job of 500,000 cubic yards. A special road a mile and one-half long had to be built to connect with Highway 61 for truck shipments, and one and eight-tenths miles of railroad siding had to be laid from the main line of the Frisco Railroad Company to service the plant.

The plant will cover the southern portion of the 4,000 acre plant site and will employ some 150 people.

dollar research laboratory, near the **Johns Hopkins Applied Physics Laboratory**, and have retained the same firm of architects, **Marlin G. Geiger, W. R. Grace v-p** and **Davison president**, told the Board that the laboratory would generate an academic atmosphere due to the rural setting, and stressed that it would not be a pilot plant.

IOWA

Continental Fertilizer Company expected by the first of this month to have completed the construction of their new plant at Nevada, and the transfer of their dry-mixing facilities from Fernald—the \$200,000 plant to be capable of producing liquid, dry and nitrogen fertilizers. **Oliver Haley** is president; **Frank Hatcher**, vice-president; **Harold Fawcett**, secretary-treasurer.

LOUISIANA

Delta Mud & Chemical Co., Inc. is the name of a concern recently chartered at Baton Rouge.

MARYLAND

W. R. Grace & Co. announced August 16 that **Davison Chemical**, Baltimore, and **Rare Earths, Inc.**, Pompton Plains, N. J., a wholly owned subsidiary, have joined in a program of expanded production, sales, research and development of rare earths and thorium, which is a potential source of atomic energy.

Rare Earths, Inc., has a plant in operation at Pompton Plains for processing rare earths and thorium from monazite sands, and additional facilities are being installed at Davison's Curtis Bay Works.

The announcement pointed out

that the new activity fits into Davison's long established interests, since monazite sands are about equal to phosphate rock in phosphorus content. In processing them to obtain thorium and rare earths, sulphuric acid is used and recovered, and phosphoric acid is derived as a by-product. Both are presently manufactured by Davison.

MINNESOTA

Agro Vita, Inc., Minneapolis fertilizer firm, has started marketing a high analysis liquid fertilizer, 12,000 annual tons.

B. W. Smith, AgroVita president, said distribution agreements have been made with the **Minnesota Liquid Fertilizer Co.**, operating 42 anhydrous ammonia plants throughout Minnesota, and with other fertilizer distributors.

The new fertilizer will be available for fall application.

MISSOURI

Missouri Farmers Association has opened up two more mixing plants, one in Centralia, with **Edgar Bailey** as manager, the other in Eldorado Springs, under **O. J. Carr**. MFA has 12 such plants in process of installation or in operation throughout the state.

Consumers Cooperative Services held open house at their new warehouse and service point in Stanberry with 4-H Club members serving refreshments. **Ralph Held**, general manager, was on hand from the Kansas City headquarters.

Freeman Bros. of Easton have begun construction of their liquid fertilizer plant and a warehouse for

dry mix materials at Plattsburg. In addition to producing the liquid fertilizer, they will continue to handle, distribute and apply aqua ammonia. Their brand and firm name are **Sur-Gro Plant Food Company**.

NEBRASKA

Clay Center Fertilizer Company, Clay Center, has been bought by Mr. & Mrs. **Tom Orthman** and renamed **Clay Center Fertilizer and Farm Supply**.

NEW MEXICO

Southwest Potash Corp., wholly owned subsidiary of **The American Metal Company, Limited**, has undertaken the first major expansion of its potash mine and mill at Carlsbad, since it began operations in late 1952. Its capacity will now be increased by one-third at an estimated cost of \$2,500,000. The new production will be ready about February, 1956. The installations are such that further expansion can readily be accomplished as market conditions justify.

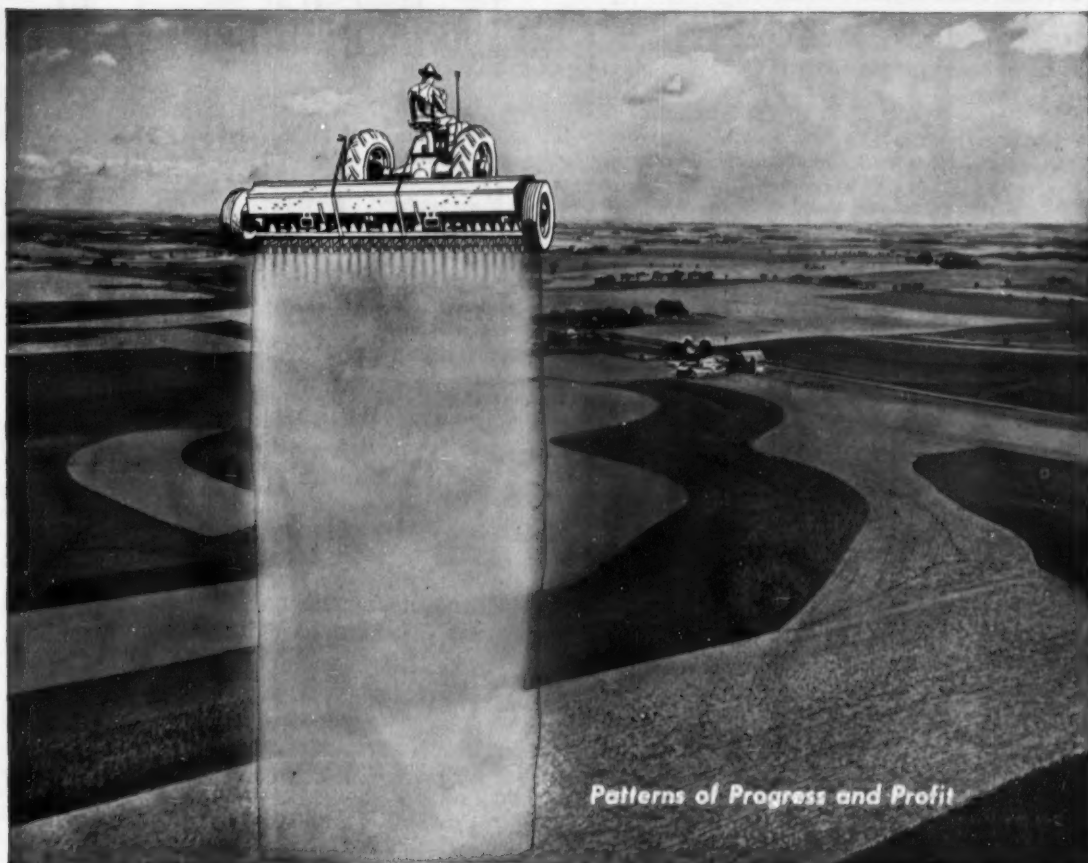
U. S. Potash will spend \$3,000,000 to expand output of its Carlsbad mine and refining units. They expect to have these facilities ready by June of next year.

NEW YORK

Soil Builders International have launched an advertising campaign in Eastern newspaper garden sections for its **Glorion lawn re-builder**. **Byrde, Richard & Pound** are the advertising agency.

NORTH CAROLINA

Grow-Green Chemicals, Inc., Bethel, has been organized by **Tom**



Patterns of Progress and Profit

(Photo—Courtesy Soil Conservation Service, U.S.D.A.)

High Grade Muriate of Potash

by



Duval Muriate of Potash
ranks high as one of the essential
nutrients which greatly increase yield
and profits in crop production.

DUVAL SULPHUR and POTASH CO.

Modern Plant and Refinery at Carlsbad, New Mexico

Address all communications to:

ASHCRAFT-WILKINSON CO.

Exclusive Distributors

ATLANTA, GEORGIA

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NORFOLK, VA. • CHARLESTON, S. C. • TAMPA, FLA. • JACKSON, MISS. • COLUMBUS, OHIO • DES MOINES, IOWA

**pack
your
fertilizer**

in

**CHASE
BAGS**

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BURLAP BAGS**

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Place your next order with:

CHASE BAG COMPANY

General Sales Offices:

309 West Jackson Blvd., Chicago 6, Illinois
30 Branches and Sales Offices-Coast-to-Coast

For High-Nitrogen Fertilizer specify Koppers Ammonium Sulphate

GOOD COMMERCIAL GRADE

Koppers offers a good commercial grade of ammonium sulphate—the ingredient that is so essential to fertilizer because of its high nitrogen content.

CHARACTERISTICS

Koppers Ammonium Sulphate comes in crystals with low free-acid and moisture content. The nitrogen content is guaranteed to be not less than 20.5%.

SHIPMENT

From St. Paul, Minn. and Kearny, N. J., Koppers Ammonium Sulphate is shipped in 100 lb. and 200 lb. bags—also in boxcars and trucks. From Granite City, Ill. and Midland, Pa., it is shipped only in boxcars and trucks.

You'll find that Koppers Company is a dependable source of supply for ammonium sulphate. Get in touch with us concerning your requirements.

KOPPERS COMPANY, INC.

Tar Products Division

Pittsburgh 19, Pennsylvania



Coal Chemicals

®

Andrews, F. L. Blount, Jr. and Mabel C. Blount, with capital stock of \$100,000.

OHIO

Anco Chemical Co., Inc. of Marion expected to have in production this month their new \$75,000 plant at Cardington, with an office building and warehouse to be ready December 1. While an office will be retained at Marion, all production will be in the new Cardington plant. **Arthur M. Bowen** is president and general manager.

SOUTH CAROLINA

A. F. Pringle & Co., Inc., Charleston will discontinue the manufacture of fertilizer December 1, and has arranged for **Davison Chemical** to manufacture for their account under the Merco brand and formulae. Pringle will continue to serve its customers from its present offices on East Bay Street, according to **L. L. Oliveros**, Pringle vice-president and treasurer.

TENNESSEE

Grace Chemical's plans, briefly mentioned here in June, for a new division to spearhead expansion, and including a \$100,000 research building, sum up to a division known as **Grace Chemical Research & Development Co.** which is headed by **William P. Gage**, former Grace Chemical president.

Shea Chemical has filed in Nashville articles increasing its authorized capital stock to 1,407,000 no par value shares.

Mid-South Chemical, amplifying the information given us for last month, will spend \$10,000,000 on a chain of anhydrous ammonia distribution centers along the Mississippi River, from Minnesota to the Gulf. The source will be the projected new plant at Lake Charles, La. and the product will be carried by 4 barges, each with 900 ton capacity. Mid-South dates to 1947 and is now the largest ammonia fertilizer concern east of the Rockies. Offices are at 1222 Riverside, Memphis.

TEXAS

Consolidated Chemical, Houston, had added 280,000 annual tons of regenerated sulphuric to their production with the \$8,000,000 plants just put into operation at Houston and Baytown.

Port Fertilizer and Chemical, Los Fresnos, have joined in a promotion of the Rio Grande Valley as a market and as an industrial area. Samples of the first bale of cotton and some seeds were first sent to a list of executives, then Port sent some of their fertilizer to use on the seeds.

Southwest Fertilizer & Chemical's branch at Clint presented \$5,000 worth of laboratory supplies and equipment to the local high schools. Branch manager **Ted Flint** made the presentation.

Galveston has gone into the fertilizer business with a fertilizer base produced at their disposal plant, which was designed by J. J. Rady & Co., and which can turn out 50,000 annual tons, which could then bring \$40,000 annual revenue to the City.

UTAH

Utah Power & Light is running national advertising of "Treasure Chest" land—by which they mean portions of Montana, Idaho, Wyoming, Colorado as well as Utah, list as evidence of the value of their area that plants established there by U. S. Steel, Kennecott Copper, Monsanto Chemical, U. S. Vanadium, Vitro Uranium and Westvaco, and speak, among other things of the presence there of 60% of US phosphate reserves.

Delhi Oil Co. is said to have found potash deposits capable of commercial development in Grand Canyon, but the **Clint Murchison** people refuse to comment.

U. S. Steel's Columbia-Geneva

Here's good chemical
for 3 jobs
Sprays
Dusts
Fertilizers
Triangle Brand Copper Sulphate

Triangle Brand Copper Sulphate has been recognized as an effective agricultural chemical for more than sixty years. In sprays (where Bordeaux mixtures are the most reliable), in dusts (if you prefer them) and in fertilizers (for additional enrichment of the soil) Triangle Brand Copper Sulphate has proved itself worthy and dependable. Try these Triangle Brand forms of Copper Sulphates:

INSTANT (powder) for quick and efficient mixing or Bordeaux sprays.

SUPERFINE (snow), **SMALL** or **LARGE CRYSTALS**, all containing 25.2% metallic copper.

BASIC Copper Sulphate in powder form, containing 53% metallic copper.

Write for booklets that will help you solve your agricultural problems.

Control **POND SCUM** and **ALGAE** with Triangle Brand Copper Sulphate. Write today for information on how it can help you maintain healthy water conditions.

PHELPS DODGE REFINING CORP.

5310 West 66th Street, Chicago 38, Ill.
40 Wall St., New York 5, N. Y.



AP&C HAD 30 SUMMER STUDENTS

Thirty college students, most of them undergraduates studying for degrees in chemistry or chemical engineering at 12 different colleges and universities, are getting a preview this summer of a career with a major chemical company.

The group is employed at American Potash & Chemical Corporation's main plant at Trona, Calif., where the students are learning how chemicals for agriculture and industry are produced. The group includes students from Brigham Young University, University of Oklahoma, University of Texas, University of New Mexico, University of Redlands (Calif.), University of Washington, University of Colorado, Stanford University, Loyola University (Los Angeles), San Diego State College, University of California and Oregon State.

Under American Potash & Chemical Corporation's summer employment program, most of the students work at regular starting production jobs, although some are assigned to special technical projects in the company's Research or Plant Technical Services Departments.

Summer student employment, which is being practiced by a number of industrial firms throughout the United States, gives the college man a chance for practical application of his academic studies and

also affords him a chance to earn money to be applied toward next year's educational expenses.

A spokesman for American Potash & Chemical Corporation said the company favors a student employment program because it encourages more young men to study chemistry and chemical engineering, in which fields there is a serious shortage of trainees.

American Potash & Chemical Corporation's student summer employment plan was inaugurated on a formal basis about five years ago to help train students for permanent positions and also to help fill in during summer vacation periods.

The plan has been so successful that the company now sends company personnel to numerous colleges and universities throughout the west to get acquainted with teachers and students.

"We believe we have found one of the most effective means possible to help the college undergraduate to plan his future and also to help finance his studies," the spokesman said. "Because of this, chemistry and chemical engineering students are welcome to write us at the Trona plant or at the Los Angeles office, 3030 West Sixth Street, to inquire about possibilities for future employment during the summer or on a fulltime basis."

Steel division will get under way with its Geneva Works, an anhydrous ammonia plant, near Provo this Fall according to **Blaw-Knox**, who are designing and will build the plant.

Engineering work is in progress, and the big task of producing materials is under way. Ground has been cleared, foundation tests for footings have been completed, and the site is being prepared for the start of construction.

This will be the first United States installation in a major steel plant using raw coke oven gas as the source of hydrogen for ammonia synthesis essential to national defense. It is expected to start a new trend in coal chemicals recovery.

The project will include:

(1) A 200-tons-per-day anhydrous ammonia plant, using the Blaw-Knox—Linde low temperature separation process to recover hydrogen from the coke oven gas and to extract high purity nitrogen from the air; and using the Blaw-Knox — Montecatini process for ammonia synthesis.

(2) A nitric acid plant based on the oxidation of ammonia.

(3) A fertilizer-grade ammonium nitrate plant, using the prilling process, producing both solid and solution forms of the product.

(4) The necessary complement of auxiliaries, including an administration building for offices and laboratory; a general service building containing a change house, machine shop, and parts storage; compressor building; utilities; warehouses; and extensive handling, bagging, storage, and shipping facilities.

VIRGINIA

Virginia-Carolina has announced plans for the construction of three new fertilizer plants in the midwest.

The plants, each designed for the production of high analysis fertilizers, will be located at Orrville, Ohio; Remington, Indiana, and Estherville, Iowa. In making the announcement, the company said it plans to start construction immediately and expects each of the plants to be in production by next spring.

When the new facilities are completed, V-C will have thirty-nine fertilizer plants in operation throughout the nation.

Founded in Richmond, Virginia, in 1895, V-C is celebrating its sixtieth anniversary this month and is one of the oldest and largest firms in the fertilizer industry.

CANADA

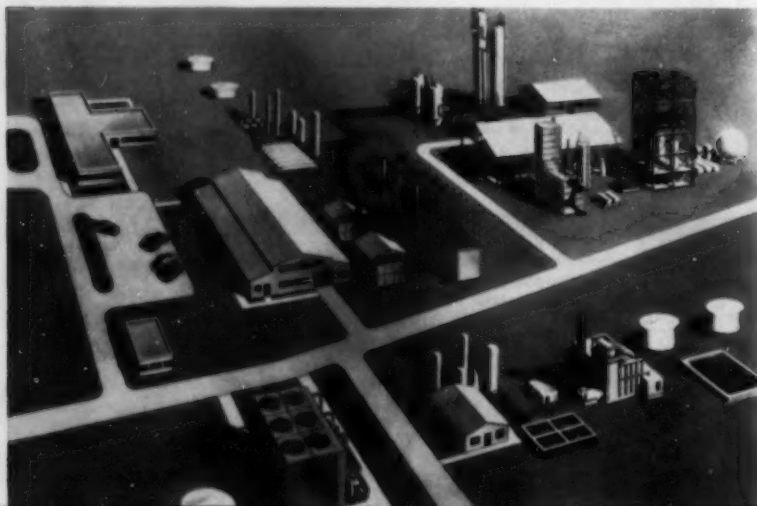
Northwest Nitro-Chemicals Ltd., has filed with the New York Securities and Exchange Commission a registration statement covering the proposed public sale of \$8,500,000 subordinate income debentures and 1,150,000 shares of common stock.

The company has been organized under the laws of Alberta to engage in the manufacture and sale of fertilizers. The two principal sponsors of the project are **Commercial Solvents Corporation** of New York, and **New British Dominion Oil Co., Ltd.**, of Calgary, Alberta.

A part of the offering will be made in Canada.

With the proceeds of the financing and a bank loan of \$12,000,000 the company proposes to construct at Medicine Hat, Alberta, a modern synthetic fertilizer plant which will include an anhydrous ammonia unit

Artist's concept of ammonia products plant being constructed by The Lummus Company at Guanica, Puerto Rico for Gonzales Chemical Industries, Inc. See page 45.





Mineralized FERTILIZER

THE *Easy* WAY WITH

Custom Formulated MINERAL MIXTURES



*Samples, specifications
and detailed information
upon request.*

For a completely balanced plant food there's now only one additional ingredient to add — Tennessee's *Custom-Formulated Mineral Mixtures* — no additional labor or mixing facilities are required — we custom mix any combination of minerals to your own specifications — Tennessee's *Custom-Formulated Mineral Mixtures* come to your plant in bulk or bag already carefully mixed in controlled amounts of soluble, readily available forms of copper, manganese, iron, zinc, magnesium and boron — you reduce material cost handling time and number of items purchased with Tennessee's *Custom-Formulated Mineral Mixtures*.

TENNESSEE



CORPORATION

617-629 Grant Building, Atlanta, Ga.

with a designed capacity of 33,000 annual tons, a nitric acid unit with a designed capacity of 39,600 annual tons, and a sulphuric acid unit with a designed capacity of 132,000 annual tons.

Contract has been let for the plant, which will run to \$22,000,000, with the work divided between **Ford, Bacon and Davis**, New York; **Canadian Kellogg** of Toronto; **Fluor** of Los Angeles. The project is due to be completed by Fall of 1956.

Potash Company of America is putting down a mine shaft in the big Saskatchewan fields which will have circular walls of solid ice, to prevent loose sedimentary strata from shifting dangerously. They are expected to be the first to reach commercially into the huge potash basin.

GREAT BRITAIN

Imperial Chemical Industries Ltd.

has undertaken to construct at **Billingham**, County Durham, England, a new petro-chemical ammonia plant.

Shell Chemical Company will take over all chemical manufacturing and marketing activities of the Shell group in the United Kingdom and Eire.

JAPAN

Sumitoma Chemical is entering the petrochemical field at Niihama with a plant to produce ethylene and ammonia, which will call for 5,000 monthly tons of oil, which will be imported, starting in March of 1957.

PUERTO RICO

Gonzales Chemical Industries, Inc., new anhydrous ammonia, sulfuric acid and ammonium sulfate plant at Guanica, Puerto Rico will shortly be

under construction. The installation was designed and will be built by **The Lummus Company**, New York.

This will be Puerto Rico's first complete ammonia products plant and will provide a dependable source of ammonia-nitrogen and related products for fertilizer, and for the industry of the island.

42,000 annual tons of anhydrous ammonia will be produced. Part will be sold as such, and the balance will be converted to aqueous ammonia, sulfuric acid, ammonium sulfate and possibly other materials for use by agriculture and industry.

VENEZUELA

Dr. Antonio Fuentes Davila and a group have applied for permission to establish a plant to manufacture fertilizers for use in the culture of tobacco, rice and sugar cane. It will be built at Cabimas, Zulia.

CONTROL OFFICIALS PROGRAM

**SHOREHAM HOTEL
WASHINGTON D. C.**

Morning Session — October 14

8:30-9:30—Registration
Reading of the Minutes of Preceding Meeting
Report of Secretary-Treasurer — **B. D. Cloaninger**, Clemson, South Carolina
Announcements and Appointments of Committees
Roll Call by States
Address by President — **Russell W. Ludwick**, State College, New Mexico
Address — **Paul T. Truitt**, Executive Vice President, National Plant Food Institute
Plant Food Research as Related to Fertilizer Practices — **Dr. J. B. Pitner**, Manager Agricultural Services, Grace Chemical Company, Memphis, Tennessee. Former Head Department of Agronomy, Clemson A&M College, Clemson, South Carolina
Ratios and Multiple Grades as Related to Soil Testing — **J. Fielding Reed**, Southern Manager, American Potash Institute, Inc., Atlanta, Georgia
New Developments in the Manufacture of Fertilizers — **Dr. E. C. Kapusta**, Technical Service Director, U. S. Potash Company, New York, New York, formerly of National Fertilizer Association
Complete Liquid Fertilizers — **R. B. Ellsworth**, General Manager, R. B. Ellsworth & Associates, Consulting Chemist, Indianapolis, Indiana
Acquainting the Public With Our Program — **W. C. Winton**, Chief Inspector, Seed, Feed & Fertilizer Division, Oklahoma City, Oklahoma, Department of Agriculture
Distribution of Bulk Fertilizer in 1953-54 — **Walter Scholl**, **Hilda M. Wallace**, **Esther I. Fox**, U.S.D.A., Beltsville, Maryland
Lunch — 12:30 p.m.

Afternoon Session — 2:30 O'Clock

Report of Investigators
General Terms — **M. H. Snyder**, Charleston, West Virginia
Nitrogen Products (Organic) — **M. P. Etheredge**, State College, Mississippi

Nitrogen Products (Inorganic) — **J. W. Kuzmeski**, Amhurst, Massachusetts
Phosphorus — **J. F. Fudge**, College Station, Texas
Potassium — **F. W. Quackenbush**, Lafayette, Indiana
Calcium, Magnesium, and Manganese — **J. B. Smith**, Kingston, Rhode Island
Boron — **Rodney C. Berry**, Richmond, Virginia
Zinc and Copper — **M. M. Phillippe**, Clemson, South Carolina
Mixing and Segregation — **M. B. Rowe**, Richmond, Virginia
Registration Forms — **John L. Monaghan**, Topeka, Kansas
Publications — **G. H. Ridder**, Olympia, Washington
Specimen Labels — **W. J. Huffman**, Jackson, Mississippi
Tonnage Reports — **Parks A. Yeats**, Oklahoma City, Oklahoma
Pesticides in Fertilizers — **A. B. Lemmon**, Sacramento, California
Specialty Fertilizers — **E. A. Epps, Jr.**, Baton Rouge, Louisiana
Report of
States Relations Committee — **H. J. Fisher**, New Haven, Connecticut
Model State Fertilizer Bill — **S. B. Randle**, New Brunswick, New Jersey
Executive Committee — **J. J. Taylor**, Tallahassee, Florida
Report of Special Committees
(a) Auditing
(b) Resolutions
(c) Nominating
Election of Officers
Presentation of Presidential Plaque to **Russell W. Ludwick**
Adjournment

The States Relations Committee meeting will be held on Thursday evening, October 13th at 8:00 p.m. at the Shoreham Hotel. This also is an open meeting and all members of the fertilizer industry are cordially invited to attend.

Enough to make the difference...

ANOTHER HUDSON MULTIWALL FIRST!

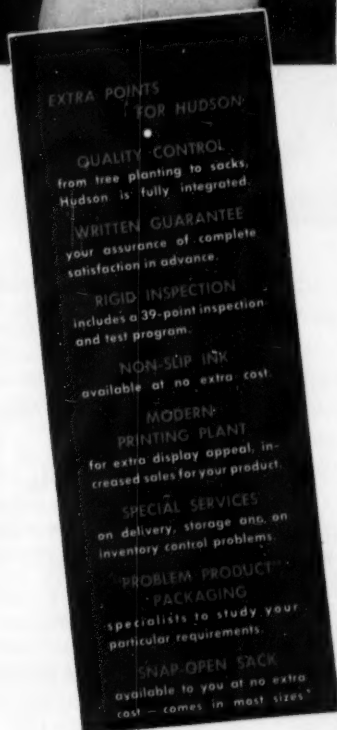


Photo left: Actual light tracing photo shows how knife blade or pull and tug method of opening wastes time and product.



Photo right: Snap motion opening — saves time and product.

Snap-Open[®]
MULTIWALL
SACKS...



Provide Speed, Ease, and Economy

The pull and tug days of opening bags are over! Now you can offer your customers the Hudson Snap-Open Multiwall bag... the one bag that opens the fastest, easiest... with just a flick of the wrist... the one bag that guarantees full measure of its contents no matter how fast it's opened.

Engineered by Hudson to meet the demands of the farmer and processor alike, the Snap-Open Sack outperforms conventional opening bags in actual tests... without a trace of spilling. Here is the answer to speed, ease, and savings... with the built-in feature of flow control.

Dealers everywhere are asking for the new Hudson Snap-Open Sacks. Be among the first packaging your product in this newest bag.

*Additional shipping points:
Wellsburg, West Virginia,
Pine Bluff, Arkansas, and
Charlotte, North Carolina.*

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YES... send us information on your Snap-Open Sack and its sales building opportunities.

Name _____ Title _____
Company _____
Address _____
City _____ Zone _____ State _____



Governor Arthur B. Langlie of Washington and Governor Paul Patterson of Oregon have accepted a challenge on behalf of their farmer-constituents as to which state is the best producer of strawberries. The winner will have temporary possession of the handsome "Oregon-Washington Strawberry Bowl."

The bowl was provided by the National Plant Food Institute and being displayed by Dr. Russell Coleman (left), executive vice president, and Delbert L. Rucker, director of publications of the Institute. Mr. Rucker, a native of the state of Washington, assisted in the planning of the contest.

The presentation of the bowl to the governor of the winning state will be a highlight of the annual banquet of the Oregon State Horticultural Society which meets at Corvallis, Oregon on December 1. Growers participating in the contest must have an average per acre yield of at least five tons of berries on a minimum of five acres.

Distinguished Speakers On Institute Radio News

Four nationally-known authorities in the field of agriculture will be guest speakers on the tenth in the National Plant Food Institute's recorded Farm Radio News Service to be used by more than 900 radio stations soon.

The speakers and their subjects are: **Oris V. Wells**, Administrator, Agricultural Marketing Service, USDA, on: "Better Foods and Better Living." **Dr. Byron T. Shaw**, Administrator Agricultural Research Service, USDA, on: "Research—Money in the Bank." **D. A. Williams**, Administrator, Soil Conservation Service, USDA, on: "Soil and Water Conservation." **Dr. Robert E. Wagner**, Research Agronomist, Agricultural Research Service, USDA, on: "Pastures—Challenge Across the Country."

The recorded service is directed to farm radio audiences, with emphasis on the importance of maintaining, replenishing, and increasing the fertility of the soil. Established in 1952, the demand for recordings has grown from 304 stations to more than 900 stations.

The service consists of four 3-minute talks by nationally-known leaders in the field of agriculture. Recordings are sent to stations only on request. Additional information on the Farm Radio News Service series may be obtained by writing to: Louis H. Wilson, Secretary and Director of Information of the Institute.

Institute To Have New TV Film

From The Ground Up is the name of the National Plant Food Institute's newest 13½ minute, TV film which is being produced in cooperation with USDA's Soil Conservation Service, to emphasize the importance of conservation in relation to soil

fertility. Location for the new movie is in Maryland.

The story is one that will be of interest to farm and city audiences alike; the importance of maintaining soil fertility, crop rotation, terracing, and conservation of water and strip cropping are emphasized by the producers.

The Institute was the first trade association to negotiate a contract with the United States Department of Agriculture under a new policy permitting commercial organizations to produce TV and feature length films in cooperation with the Department.

In addition to distribution by the Soil Conservation Service state offices throughout the country, film service also will be provided by the Institute. Announcement will be made later as to when production is finished and films are available for use by members.



Institute Publications Right Up-to-date

Every Monday morning there appears on the desks of the members of the National Plant Food Institute, the weekly News Report which represents hard work, and many extra week-end hours by Delbert L. Rucker, the Institute's director of publications, and Peter C. Crolus, his able assistant. Del also edits the fine, informative Plant Food Review, issued quarterly. Illustrated above is the new seal of the Institute, which represents the relationship between the industry, research and the farm.

"Increased Use Of Plant Food Important To Entire World" Says Woods

The American farmer is increasing his use of plant foods by 10 per cent each year, J. Albert Woods, President of Commercial Solvents Corporation, reported to the American Society of Agronomy, Northeastern Branch, at the 75th Anniversary Celebration of the Jordan Soil Fertility Plots at Pennsylvania State University.

Not only is the use of mixed fertilizers on the upswing, Mr. Woods said but among the three basic plant foods, nitrogen leads in use as a separate item.

Plant food research in the last 15 years has helped to bring about a fourfold increase in the use of fertilizers, Mr. Woods said. This is a growth twice as great as for the 30 years prior to that time.

He urged the American fertilizer industry to look upon the world as its market. "To seek to make the United States the breadbasket of the world is sheer folly," he said. "We must marshal our research, our production and our ability to sell good and useful plant foods in a broad and long term effort which will help the world to adequately feed itself."

"A well fed world is our best basis for a free world," Mr. Woods pointed out. "There can be neither comfort nor security in always having a full stomach nor in the promise of continuing to have one, when your neighbors, near or far, are existing on a starvation diet."

Referring to present day farm surpluses and predictions of plant food production in excess of current demand, Mr. Woods said that the world's desire for a higher standard of living and a rapidly growing world population offset these conditions and predictions.

"Here in the United States, the amount of land under cultivation is about the same today as it was 40 years ago. We must rely upon getting greater crop yields from the same or less acreage. If the farmer is to find a market for his full yield, his price per marketed unit must not be more than his customers are able and willing to pay."

One task before the plant foods industry, Mr. Woods said, is to make it clear to farmers that his best bet for the future is to work the same or less acres and more efficiently in an effort to lower costs and market prices.

Get Better Ammoniation WITH NATURAL-TEXTURE V-C Triple Superphosphate



Quality is the watchword at the big, new V-C Triple Superphosphate plant at Nichols, Florida. Here, V-C Triple Superphosphate is produced so that it retains its natural, desirable texture—a big help to you in simpler, faster ammoniation in your plant. This superior texture also helps you cut down on recycling at

your mixing machines. V-C Natural-Texture Triple Superphosphate is backed by many years of experience and production know-how. V-C pioneered in the production of concentrated superphosphate as far back as 1907, when it put into operation, at Charleston, S. C., the first large-scale plant in the United States.

Depend on V-C to supply your Triple Superphosphate needs. Newly-expanded facilities and years of skill in production now combine to bring you Natural-Texture Triple Superphosphate designed to fit your production programs. Write or call *now!*

VIRGINIA-CAROLINA CHEMICAL CORPORATION

401 East Main Street, Richmond 8, Virginia

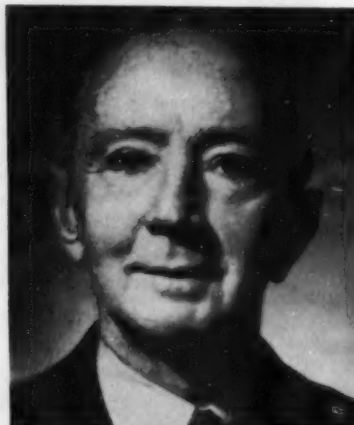


20TH ANNIVERSARY

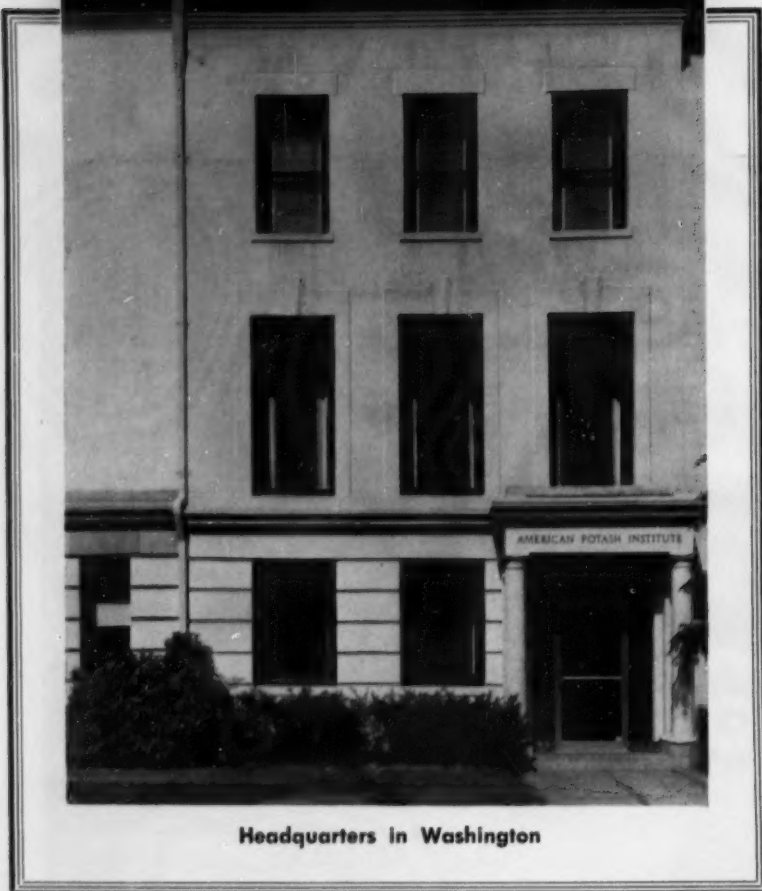
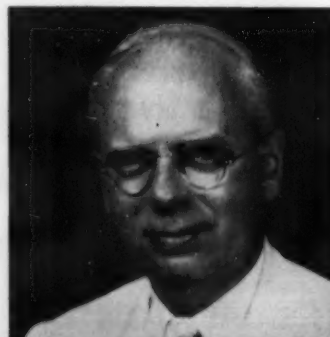
H. B. Mann, B.S., M.S., Ph.D.
Chairman, President & Treasurer



J. W. Turrentine, Ph.B., M.S., Ph.D.,
D.Agr.—President Emeritus



J. D. Romaine, B.S., M.S.
Vice President & Secretary



Headquarters in Washington

By J. D. ROMAINE, in "Better Crops with Plant Food"

The American Potash Institute is a unique organization in that it is supported by commercial companies—five of the six leading potash producers in the United States—but is not a trade association in the usual concept of the term. The Institute is a research and educational organization which has for its purpose the promotion of the agricultural use of potash on a basis that is sound and profitable to the farmer. It does not concern itself with legislative, production, or trade matters.

The Institute, organized as a non-profit corporation under the laws of the State of Delaware, began operations July 1, 1935. Its purposes and operation are well set forth in the Articles of Incorporation as follows:

"(a) To promote the efficient and profitable use of potash in agriculture in Cuba, Canada, and in the United States, including Hawaii and Puerto Rico, hereinafter called Institute countries.

"(b) To serve as a medium for the exchange of information on the use and consumption of potash between the members of the Institute, on the one hand, and the several state, fed-

eral, provincial, dominion, and territorial agricultural authorities and all others interested in the use of potash fertilizers in agriculture, on the other hand, and cooperate as a unit with other plantfood producers.

"(c) To aid in securing the coordination and cooperation in experimental work and the use of potash between members of the Institute and agricultural workers and between members and state and federal agricultural authorities.

"(d) To conduct research and experimental work with potash and to disseminate practical potash information to members of the Institute, potash distributors, the fertilizer trade, agricultural advisers, and especially the farmer."

Members and Staff

All the principal units of the potash industry in operation at the time participated in establishing the Institute. These were the American Potash and Chemical Corporation, Potash Company of America, and the United States Potash Company, all American producers, and the N. V.

American Potash Institute

WHAT IT DOES AND HOW IT WORKS

Potash Export My., importers of European potash. The three American companies still are members of the Institute, and the Southwest Potash Corporation and Duval Sulphur and Potash Company became members after they came into production. The outbreak of World War II brought about the dissolution of the N. V. Potash Export My., necessitating its resignation.

The governing body of the Insti-

tute is the Board of Directors, consisting of two representatives from each of the five Member Companies and the President. The Board appoints the officers, sets the budget, and determines the general policies to be followed.

The staff consists of 16 agronomists, 2 editors, 2 librarians, and 11 secretarial and clerical employees, a total of 31.

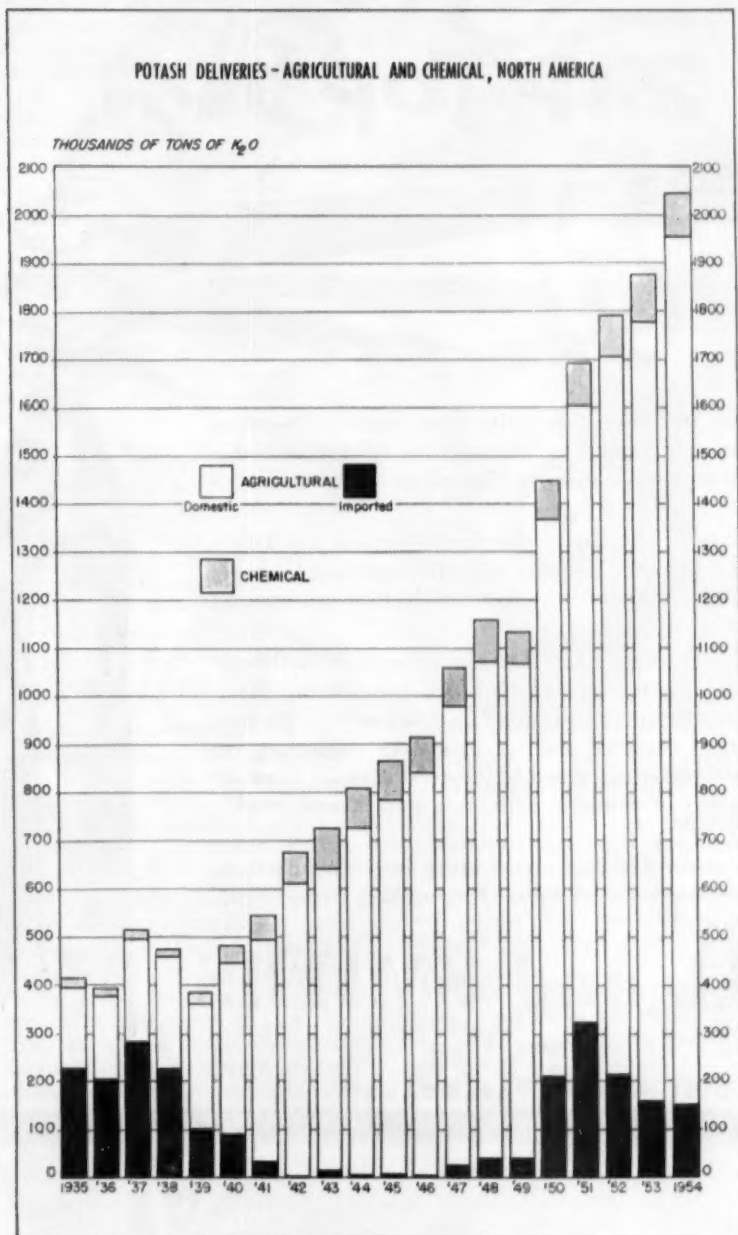
The activities of the Institute are organized under four functional categories, agronomic, economic, informational, and library. Superimposed on the functional organization is a geographic organization. The informational and library activities are centered in the executive offices in Washington, D. C. There are five territories, each under the charge of a manager, who is responsible for all Institute activities in the territory. The office for the Southern Territory is in Atlanta, Georgia; that for the Midwest Territory is in Lafayette, Indiana; the Western States office is in San Jose, California; the Canadian office is in Burlington, Ontario; while the Manager of the Northeastern Territory makes his headquarters in the Washington, D. C. office.

In some of the territories, there are field agronomists, under the direction of the territorial manager. At present there are five field agronomists in the South, two in the Midwest, and two in the Western States.

Fellowships and Grants

In the territories covered by the Institute there are more than 6 million farms and it would be a physical impossibility for the staff of 16 agronomists to make personal contact with even a small percentage of these farms. It has therefore always been a basic policy to work primarily through or with other groups in finding out where and how potash should be used. Fundamental information is developed mostly through research fellowships and grants to agricultural colleges and experiment stations.

This fellowship program might be considered as the foundation of all other activities of the Institute. Information on how potash can be used most effectively in areas where its use already is established, exploration of new areas where its use can be developed, and the investigation of new crop outlets in all areas has to be obtained if potash usage is to be increased on a sound basis. When the Institute began its activities, it was decided that rather than set up its own laboratories, it would be more effective to utilize the excellent





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Wasteful "buckshot" pouring is eliminated because Zip Top — with almost no effort — provides a clean, controlled opening to empty all of its contents. Economy and customer-satisfaction are assured all around.

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facilities already available in the agricultural colleges and experiment stations.

Budgetary limitations do not permit the Institute to maintain fellowships continuously in all states and provinces. They therefore are rotated, with selection of those places where the problems are most urgent, or where facilities for work on a particular project are most favorable. In the 20 years of the Institute sponsorship, fellowships have been supported in 38 states and provinces. The projects, of variable duration and scope, numbered 90 and more than 200 men conducted the investigations, in most cases leading to advanced degrees for the investigators. The total amount of money paid the institutions for these fellowships and grants was about \$750,000.

Project of a more practical nature, frequently in the form of demonstrations comparing different fertilizer practices, are conducted in cooperation with agricultural extension forces, Soil Conservation Service, county agents, vocational agriculture teachers, and other groups. The total spent for such activities has been about \$500,000. Thus the funds expended directly for investigational projects of one nature or another have totaled about \$1,250,000.

Informational Services

The economic activities of the Institute are rather modest in scope. They consist primarily in compiling for release to the public current records of potash deliveries in Institute countries and a series of wholesale prices of fertilizer materials and crops. The basic work in compiling the price records, done under a grant at Cornell University, was recently brought up to date by a grant at the University of Maryland. This is probably the oldest series of fertilizer materials prices in the country.

In making information on the efficient use of potash available to as many interested people as possible, the Institute has employed the more important means, including publications, motion pictures, radio, television, and advertising. Through these channels this service has been directed to two audiences—the official agricultural advisers and those whom they advise.

The monthly magazine, **Better Crops With Plant Food**, is edited primarily for the advisory groups—the county agent, teacher or vocational agriculture, members of the Soil Conservation and other Government Services, staffs of colleges and experiment stations. In it are presented the results of research and experi-



R. H. Stinchfield, B.S.
Publications



J. Fielding Reed, B.S., M.S., Ph.D.
Manager, Southern Office



W. L. Nelson, B.S., M.S., Ph.D.
Manager, Midwest Office

mental work in soil and crop management in relation to a proper use of plant food, written for the most part by the authorities who did the work. In 1935 the circulation of this magazine was 14,000. It now is 24,000.

Two books, **Diagnostic Techniques for Soils and Crops and Potash Deficiency Symptoms**, have furthered information about potash. In the former, eminent scientists provided chapters to bring together in one

volume what was known about diagnosing soil fertility and crop nutrition for optimum production. The 10,000 edition, underwritten and published by the Institute, was rapidly sold out. In the other book, the Institute collaborated with French and German scientists in a volume printed in the three languages and illustrated with many color plates. This book also is no longer available.

Potash News Letters, a timely mimeographed service, are issued regularly to circulate in the various territories items on latest research involving efficient fertilization. These letters, together with more than a half million reprints of popular articles from **Better Crops With Plant Food** annually provide information for the farmers.

Advertising in the important farm journals has supported official recommendations on the use of plant food. Farmers are also reached with motion pictures pertaining more particularly to methods for determining potash and other fertilizer requirements. All of these films, from time to time, have been televised. Another visual aid given wide distribution was a set of colored wall posters, one showing the amounts of the three major plant foods utilized by good yields of 20 important crops and the other three showing typical potash-deficiency symptoms on corn, cotton, and legumes. Similar information on various crops illustrated in black and white had been circulated in thousands of circulars prepared by the Institute for distribution to farmers through the fertilizer trade.

A direct service to the press has been maintained for news of interest involving potash. Releases on deliveries of potash salts and agronomic stories have served their purpose in keeping up to date the information on progress in potash usage.

With these services as well as voluminous correspondence and talks before agricultural gatherings and personal contacts, the Institute staff has attempted to disseminate to the interested public the assembled agronomic, economic, and statistical information on potash in agriculture.

The library maintained by the Institute in its Washington Office contains over 200,000 bulletins, books, theses, and periodicals. It is a rather specialized library, devoted mostly to literature on soil fertility, crop production, and related subjects. Literature lists an annotated bibliography of current work on potash in agriculture are issued for use by research workers and other libraries.



M. E. McCollam, B.S.
Manager, Pacific Coast Office



S. D. Gray, B.S., M.S.
Manager, Northeastern Office



R. P. Pennington, B.S., M.S., Ph.D.
Manager, Canadian Office

The potash producers who support the American Potash Institute have invested in it a total of more than \$7,400,000 over the 20 years of its existence. This is a sizable sum to spend on the development of a market, but the results would appear to have justified it. In 1935, agriculture

in North America took about 393,000 tons K.O. In the calendar year 1954, the same area took nearly five times as much potash, or 1,955,000 tons K.O., the rise being unbroken since 1939, except for 1949 when a strike in the Carlsbad, New Mexico producing area reduced output.

In 1935 less than half the potash used in North America was of American origin, and it was not until 1933 that American deliveries pulled ahead of European potash. With the cutting off of European imports due to the war, the American potash industry was faced with a major decision. Should it expand its production facilities to fill the gap left by the cessation of imports, or should it conserve its capital to enable it to meet the competition likely upon the resumption of imports after the war? This decision was the more difficult to make in the face of lack of any tariff protection, and the fact that the funds involved

would all be private capital. The work of the Institute was just getting under full momentum, but already there were indications of greatly increased future needs for potash on the continent. The new American potash industry therefore decided to plan for an expanding potash market in the future and undertook to increase greatly its production capacity as fast as war conditions would permit. The record shows that this faith in the future was fully justified. A shortsighted policy of standing pat would have resulted in a serious shortage of potash in North American agriculture, interfering with the war effort, with consequent losses to farmers and the general public.

It is felt whatever success has attended the work of the American Potash Institute is due to the policy of the American potash producers that the use of potash should be on a basis sound and profitable to the farmer. The producers realized that only in this way could their business continue to grow and prosper. This policy was laid down in establishing the Institute and has consistently been followed ever since. In this way the confidence of the official agricultural advisory groups was gained, and only by following such a course could the Institute have obtained their cooperation, so essential in the success of such a large undertaking.

Sou. Weed Conference January 16-18, New Orleans

The Ninth Annual Meeting of the Southern Weed Conference will be held early in 1956 at New Orleans, Jan. 16-18, it was announced by Glenn C. Klingman, president. All sessions will be held at Hotel Jung.

Dr. Klingman said the purpose of the meeting is to bring together all phases of weed control research and education in the Southern part of the United States.

Attending will be representatives from state experiment stations, USDA, extension services, the agricultural chemical and farm equipment industry, vocational agriculture and the farming industry.

Weed control in pastures, field crops, horticulture and other phases of agriculture will be discussed by leaders in this field from all Southern states. Dr. Mark Weed, E. I. du Pont de Nemours & Company, c/o Botany Department, Louisiana State University, Baton Rouge, is the program committee chairman. Those in-

terested in the program should contact Dr. Weed.

Officers for the 1956 conference include Dr. W. B. Albert, South Carolina Agricultural Experiment Station, Clemson, S. C., Vice President and Dr. E. G. Rodgers, Florida Agricultural Experiment Station, Gainesville, Secretary-Treasurer.

GaPFES Issues Corn Bulletin

Corn being so vital a crop to their State, the Georgia Plant Food Educational Society has issued "Corn in Georgia", a bulletin emphasizing the results from fertilizer use on this crop, prepared by J. R. Johnson, J. Frank McGill and Harold Gurley, extension service agronomists.

INDUSTRY CALENDAR

Date	Organization	Place	City
1955			
Sept. 7-9	Nat'l Ag. Chem. Assn.	Essex & Sussex	Spring Lake, N. J.
Sept. 23	SC Society	Columbia Hotel	Columbia, S. C.
Oct. 13-14	Nat'l Nitrogen Solution	State Armory	Springfield, Ill.
Oct. 14	Control Officials	Shoreham Hotel	Washington, D. C.
Oct. 17-18	Fertilizer Safety Section	La Salle Hotel	Chicago, Ill.
Oct. 27	Middle West Soil	Sherman Hotel	Chicago, Ill.
Nov. 2-3	Pacific N.W. Plant Food	Pilot Butte Inn	Bend, Oregon
Nov. 7-8	California Fertilizer Assn.	Mark Hopkins Hotel	San Francisco, Cal.
Dec. 5-7	Ag. Ammonia Institute		Kansas City, Mo.
1956			
Jan. 4-6	Weed Society of America	New York Hotel	New York, N. Y.
Jan. 16-18	Sou Weed Conf.	Jung Hotel	New Orleans, La.
Feb. 15-17	Western Weed Control Conf.	Univ. of Calif.	Davis, Calif.
Mar. 4-6	Sou Safety	Biltmore Hotel	Atlanta, Ga.
June 28-30	Sou Control		Roanoke, Va.
July 18-20	SW Grade	Bucaneer Hotel	Galveston, Tex.
July—	Eastern Canada		Mont Tremblant, Que.

FLUOR

Phosphoric Acid Plants

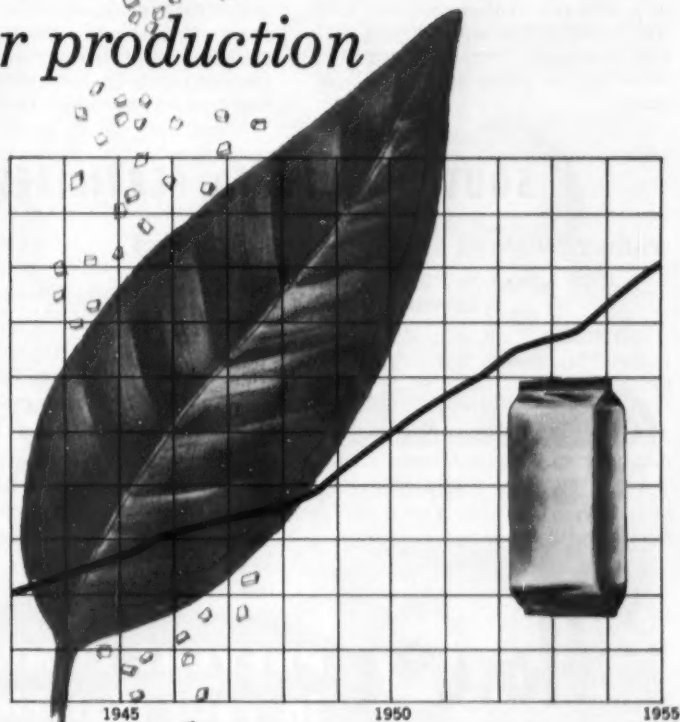
— your key to profitable

P_2O_5 fertilizer production

Fluor-designed phosphoric acid plants, utilizing the low-cost St. Gobain-Union Chimique Belge process—used with outstanding success in Europe—can improve the profitability of your operations in the rapidly expanding fertilizer industry.

If you are now producing basic raw materials and seek new outlets, or if you are already part of the vital fertilizer industry and want a broader line of products, investigate this newest method of supplying P_2O_5 to the ever-growing agricultural market.

Your inquiries are welcome. Send today for Fluor's latest brochure on phosphoric acid and phosphate fertilizer plants... or contact the Fluor District Office nearest you.



Use of agricultural phosphoric acid which has been increasing sharply since the end of World War II... continues to climb.

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ECONOMY... lower initial investment, lower operating cost potential.

CONVENIENCE... plant can be shut-in as long as 24 hours without "dumping" or costly reworking of material in process.

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FLEXIBILITY... can use entire range of H_2SO_4 concentrations from 78 to 98%.

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HOUSTON
BIRMINGHAM
TULSA
DENVER

Safety

South Point Makes New Safety Record

The South Point, Ohio plant of Nitrogen Division has passed another safety milestone, by working more than a million man-hours without a lost-time injury. Eight individual plant sections have worked 3,628 days each without a lost time injury, and two of those sections have within themselves worked more than a million injury-free man hours each, according to plant manager C. W. Bahrt.



Group in attendance at Executive Committee meeting, Fertilizer Section, National Safety Conference, Roanoke, Va., June.

Olin-Mathieson Plants Set High Safety Records

Eight Olin Mathieson plants have been cited recently for their safety performances. At the North Little Rock acid plant, workers were awarded safety lighters at a dinner meeting July 30, the awards being made on an individual basis for the

completion of 4,000 man hours without a reportable injury.

Seven plants have for the third year received certificates from the Manufacturing Chemists Association, for operation through 1954 without a lost time accident. Only 317 such awards were made in the whole Chemical Industry.

SOUTH CAROLINA FERTILIZER SAFETY MEETING

FRIDAY MORNING AND AFTERNOON SESSIONS

10:00 A.M., 2:30 P.M., Francis Marion Hotel
November 4, 1955

PRESIDING: Alton L. Foster, Superintendent, International Minerals & Chemical Corporation, Spartanburg, South Carolina.

REPORT ON ACTIVITIES OF SAFETY ORGANIZATIONS: V. S. Gornto, Manager, Insurance Department, Smith-Douglas Company, Norfolk, Virginia.

ACIDULATION HAZARDS: E. U. Campbell, Superintendent, Anderson Fertilizer Company, Anderson, South Carolina.

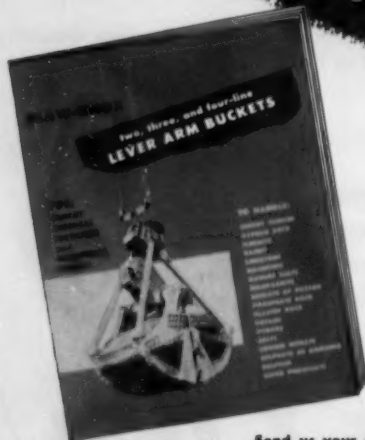
SAFETY ORGANIZATION IN A SMALL PLANT: J. P. Huckaby, Superintendent, Southern Fertilizer & Chemical Company, Roebuck, South Carolina

MATERIAL HANDLING HAZARDS: Percy L. Steele, Superintendent, F. S. Royster Guano Company, Charleston, South Carolina.

ELECTRICAL HAZARDS: Ralph C. Haltiwanger, Chief Electrician, Virginia-Carolina Chemical Corporation, Charleston, South Carolina.

APPLICATION OF DRESSINGS FOR PRACTICAL FIRST AID: Cleo H. Everhart, Representative, Southern First Aid Company, Lexington, North Carolina.

How to PREVENT CONTAMINATION in your Material Handling Operations



Send for this Bulletin about BLAW-KNOX Tight-Lip Buckets

THIS BULLETIN tells how the "tight-lip" construction of Blaw-Knox Chemical and Fertilizer Buckets prevents costly contamination caused by leakage of granular fines.

Blaw-Knox Buckets are designed with proper distribution of weight for maximum performance based on many years of intimate experience in the handling of various bulk materials in the chemical and fertilizer fields.

The wide range of available models permits a selection of the proper size, weight and type bucket to fit your installation requirements and obtain peak performance.

Send us your problem and ask about the Blaw-Knox engineering service available without obligation to help you solve it. Write for Bulletin 2378 today.

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Blaw-Knox Equipment Division
Department 462
PITTSBURGH 38, PA.
Offices in Principal Cities

BLAW-KNOX FERTILIZER BUCKETS

PERSONALS

The appointment of **William R. Burgess** as manager of mid-west sales for the fertilizer division of **J. R. Simplot Co.** was announced by **Ben D. McCollum**, Simplot sales manager, who stated that the action, in effect establishes mid-west sales headquarters at Greeley, Colorado from which city Burgess will service the territory.

The new appointee was formerly manager of the Simplot Soil-builders unit at Greeley. That position will be filled by **Larry Schumacher** who managed a branch unit at Swink, Colorado.

• • •

Appointment of **W. L. Dixon, Jr.**, as general manager of the **Western States Chemical Corporation**, is announced by the firm's board of directors.

Dixon will head a new Western States fertilizer plant, now under construction at Nichols, California, which will have a capacity of 200 tons per day of pelleted complete fertilizers, when it begins operations early in 1956.

E. W. Rowbotham will serve as the Nichols plant manager.

• • •

Bernard M. Machen has been named assistant general manager of chemical sales for **Lion Oil Company**, according to an announcement by **A. F. Reed**, company vice president. Machen, who will have his headquarters in El Dorado, has been district chemical sales manager at Montgomery, Ala., since June 1949.

• • •

D. W. Aitken, manager of **Kickapoo Fertilizers**, Hillsboro, Wisc., announces the selection of **R. B. Baldrige II**, of Savannah, Ga., as assistant manager with headquarters in Hillsboro. Mr. Baldrige has been associated with **Southern States Phosphate and Fertilizer Co.** at Savannah in various capacities both in sales and production of fertilizers. Before leaving there to join Kickapoo, he was general superintendent of the firm's manufacturing operations.

Pete W. Giddings has been named superintendent of the fertilizer grade ammonium nitrate section of the **Spencer Jayhawk** plant, Pittsburg, Kans. Giddings has been assistant supervisor of the ammonium nitrate section. He has been with the plant since 1942 and has held several production places during that time.

Mr. Giddings succeeds **George E. Frey** of Joplin, who is being transferred to the Henderson plant of the company.

• • •

Ralph Crowder has assumed charge of the **Monarch Fertilizer Company** office, Muskogee, Okla., following the resignation of **Kenneth A. Schmitt**, vice president and manager.

• • •

Col. William B. Tilghman, company president, has announced that **Richard C. Bunting** has been appointed special sales assistant to **Ralph A. Ross**, manager of the Pocomoke plant of the **William B. Tilghman Co.**

As additional duties, Mr. Bunting will maintain a soil testing service for Eastern Shore farmers and be in charge of bulk spreader truck service and liquid nitrogen application in that area.

• • •

Ultra Chemical Works, Inc., Paterson, N. J., announced appointment of **Richard M. Young, Jr.**, as assistant sales manager responsible for the sales activities of Ultra's field representatives.

• • •

The **D. M. Weatherly Company** has announced that **Harold L. Kitchens** has joined their organization as Sales Engineer. Mr. Kitchens is widely known by fertilizer manufacturers in the middle West as a result of several years of association with the design and installation of fertilizer production facilities.

• • •

Harold D. Rogers has been promoted to superintendent of ammonia plant, and **W. G. Heywood** has



C. A. Graft has joined **Alabama By-Products** as service and sales engineer and will devote his entire time to servicing and selling all nitrogen products, viz., sulphate of ammonia produced at its Tarrant, Alabama, Coke and Coal Chemicals plant, and anhydrous ammonia and ANA solutions produced at the nearby plant of **Ketona Chemical Corporation**. **Ketona Chemical Corporation** is jointly owned by **Alabama By-Products Corporation**, Birmingham, and **Hercules Powder Company**, Wilmington, Delaware.



Dr. John B. Pitner, named manager of agricultural service for **Grace Chemical**, in charge of their agricultural service program.



William F. Watkins, promoted by **Olin Mathieson** from Eastern division agronomist to agronomist for Great Lakes sales district.

Ed M. Peterson, who has joined **Arkell & Smiths** as a flexible packaging sales manager.



It pays you, the dealer and the farmer to concentrate on the premium

CASH IN ON THE SWING WITH THESE QUALITY

SULFATE OF POTASH

High grade, low chloride *International Sulfate of Potash* can help you build a profitable volume of business on the premium fertilizers made for crops adversely affected by excess chlorides. Your farm customers will get improved quality and increased yields on high value crops such as tobacco, potatoes, vegetables, tree fruit and small fruit when they use fertilizers made with sulfate of potash. This quality plant food material is soluble, well conditioned and can be used without changing your present mixing processes.

At Carlsbad, New Mexico, *International* mines and refines these fine quality plant food materials for fertilizer manufacturers:

Sul-Po-Mag—Double Sulfate of Potash-Magnesia—22% K_2O —18% MgO
Sulfate of Potash—50% K_2O Minimum Muriate of Potash—60% K_2O Minimum
Muriate of Potash—Granular—60% K_2O Minimum



potash division

fertilizer grades needed for profitable production of many crops.

TO PREMIUM FERTILIZERS POTASH MATERIALS



Sul-Po-Mag

Sul-Po-Mag enables you to produce premium grade fertilizers with a properly balanced combination of *two* essential plant foods: *sulfate of magnesium* and *sulfate of potash*. Both are water-soluble and readily available to growing crops.

Agricultural experiment station studies show that the soils in many crop-growing areas are critically low or deficient in available magnesium. In fact, this nutrient is so important to profitable crop production, it's often called *the fourth element in the fertilizer bag*.

Sul-Po-Mag has been advertised consistently in farm papers for many years. You'll find a welcome market for premium grades containing *Sul-Po-Mag* for use on soils that are deficient in magnesium and potash. For many farmers know from experience it helps them increase crop production, increase quality and increase profits.

When you use *Sul-Po-Mag* in the bag, identify it on the bag . . . N-P-K-Mg tells farmers that yours is a premium fertilizer.

PUT IT IN THE BAG

PUT IT ON THE BAG



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(95% Nitrate of Potash)

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Special Mixtures and Soluble Fertilizers
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Fur-Ag is readily available ... inexpensive, produced in volume, shipped to you on schedule 12 months a year. Among Fur-Ag's many advantages: reduces bag set, speeds up curing in the pile, provides bulk, sterilized—free from plant diseases, insects and weed seeds. Fur-Ag's dark, natural color helps make a rich-looking product. Write today for Bulletin 127.



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SULPHURIC ACID

Ground Cotton Bur Ash, 38/42% K₂O Potash.

Nitrogenous Materials

Castor Pomace

Urea, 45½% and 46% Nitrogen

Calcium Ammonium Nitrate, 20.5% Nitrogen

Representatives

Morgan Brothers Bag Company, Inc.

Bags—Paper and Textile

Ammoniated Base and Superphosphate

Dolomitic Lime

(43-44% Magnesium Carbonate)
(54/56% Calcium Carbonate)

POTASH

PEOPLES OFFICE BUILDING

Charleston

South Carolina

Phones: 3-4828 and 3-4829

been moved up to the post of assistant from shift supervisor of the South Point, Ohio, plant of **Nitrogen Division**, according to announcement from C. W. Bahrt, Jr., plant manager.

* * *

Robert C. Hector has been named president of **Hector Supply Co.**, succeeding his brother **Louis J. Hector**, who has retired.

Two new members also have been named to the farm supply firm's board of directors. They are **Adrian Jacobs** of Homestead, and **Frederick J. Maxted, Jr.**, of New York. Mr. Jacobs also was elected vice president.

Carl E. Reger, a vice president, was elevated to secretary-treasurer, a job formerly held by the new president.

* * *

Paul F. Steinhoff tells us he has been transferred to Venezuela by **Blaw-Knox Company**. His address: Blaw-Knox de Venezuela, C. A., Edificio Polar, 4 Piso, Plaza Venezuela, Caracas, Venezuela.



Joe W. Morgan, who has been promoted to salesmanager of Eastern tractor equipment division by Hyster Company.

Kenneth A. Spencer, president of **Spencer Chemical Company**, has announced two major shifts in the Spencer organization. In the first move, **Richard F. Brown**, general works manager, was named vice president and general works manager. In the second move, the research and development activities of the company were established as a separate division. **Dr. John R. Brown, Jr.**, general manager of research and development, was named managing director of the new division. Although they bear the same name, these gentlemen are not related.

* * *

The appointment of **Clinton B. Burnett** as general manager of the **Johns-Manville Celite** division, was announced by **A. R. Fisher**, president of Johns-Manville Corporation.

Mr. Burnett succeeds **Arthur S. Eisenbast**, a pioneer in the develop-



Photographed at the annual fertilizer meeting at the U of Kentucky, August 10 are: Professor P. E. Karraker, University of Kentucky; Dr. J. H. Lilly, Iowa State College, Ames Iowa; Dr. Russell Coleman, National Plant Food Institute, Washington, D. C.; Dr. G. T. Webster, Head of the Agronomy Department, University of Kentucky and Bruce Poundstone, Head of the Department of Feed and Fertilizer, University of Kentucky.



Two Smith-Douglass Co. employees with a total of 51 years' service have retired at the company's Norfolk, Va., plant. President Ralph B. Douglass (left) was on hand to congratulate and thank F. M. Edwards, 18 years (second from left), and George T. Wood, 33 years (third from left), with Robert B. Rowland, Rowland, who with Oscar Smith founded the Smith-Rowland Co., which ultimately grew to become the Smith-Douglass Co., hired both Wood and Edwards. Wood, one of Smith-Douglass' oldest employees in length of service, was a Norfolk factory salesman, and Edwards a maintenance foreman. Both retired under provisions of the company's pension plan.

ment of manufacturing methods and uses of diatomite products who retired on July 31, 1955.

Mr. Burnett continues as vice president of **Johns-Manville Products Corporation**. He was director of engineering before his appointment as assistant general manager of the Johns-Manville Celite division in July of 1954.

* * *

Five staff changes in **Shell Chemical Corporation** were announced by **F. W. Hatch**, manager of the agricultural chemicals division, New York. The changes were made because of the rapid expansion of business and the need for a better distribution of administrative responsibilities.

L. G. Smith, who has been assistant to the sales manager, has been appointed manager of the newly-created distribution-operations department.

W. E. McCauley, head of product and sales development department, was named assistant to the sales manager.

C. C. Compton was named manager of the sales development department—formerly known as the product and sales development department.

H. H. Dodge, senior district representative for the St. Louis district,

was named supervisor for the sales development department in the Midwest area. He will continue to operate from the St. Louis district office.

J. F. White will be district manager for the newly-created Delta-Houston area. District headquarters will remain at Jackson, Miss.

Rochester Opens This Month

The plant of the new **Rochester Fertilizer** company, should be in operation by late September.

The new corporation, formed in May, will manufacture fertilizer and sell in a four or five-county area adjacent to Rochester. Original members of the corporation and directors are **T. H. Johansen**, **E. H. Lundquist**, **Elmer Halling**, **C. C. Pagenhart**, **Edward J. Foster** and **Eldon Roddis**.

Constructed of steel and concrete, the building has a main mixing area of 65 by 155 feet. Adjacent to a bagged goods storage and office space 40 by 60 feet. The latest in modern machinery is going into the plant, from the **Stedman Foundry and Machine**.

Mixing capacity of the plant will be 20 tons an hour with a bagging capacity of 20 to 30 tons an hour. Bulk storage capacity is 3,000 tons.



A newcomer to materials handling equipment is this Napco Loader, Model NL-50, 15 cubic feet, front end loader, with front wheel drive and rear wheel steering, designed for handling all bulk materials. Its manufacturer, Napco Construction Equipment, a division of NAPCO, Inc., Minneapolis, Minnesota, announces that the first units are now in production.

For further information, write Napco Construction Equipment, a division of Napco Industries, Inc., 834 North Seventh Street, Minneapolis, Minnesota.

New Blaw-Knox 24 Page Catalog

Blaw-Knox has just issued a new 24-page catalog on 2, 3, and 4 line clamshell buckets, classified for cement, chemical, and fertilizer industries.

Operating and designing engineers will find the publication provides an excellent reference for selecting the proper bucket and equalizer required for attachment to existing or contemplated cranes. Line drawings

and photographs illustrate the different styles of equalizers for attachment of holding lines.

Included are classified tables of some 60 different sizes of buckets, containing weight, dimensional and capacity data as well as a listing of plants in which these buckets are in use.

Copies of Bulletin #2378-R may be obtained free of charge by writing to Blaw-Knox Company, P. O. Box 1198, Pittsburgh 30, Pa.

Emulsol Chooses Coast Representatives

The W. G. Wunderly Company, Pasadena, Calif., and F. M. Speakman Co., San Francisco have been selected to serve as technical sales and service representatives in Southern and Northern California respectively in the agricultural industry for Emulsol Chemical Corporation of Chicago.

OBITUARIES

Henry H. Allen, 82, retired as vice-president and director in 1953 after 54 years service with Bemis Bro. Bag Company, died August 13 at his summer home in Huntington, N. Y.

Dr. William J. Hale, 79, Dow Chemical research consultant and one of the nations top organic chemists, died August 8 after a brief illness.

W. P. Roche, Sr., 65, owner of Roche Manufacturing Co., cotton ginning and fertilizer, and for many years with Southern Cotton Oil, died at his home in Dublin, Georgia August 19 after a long illness.

Donald D. Wood, 43, president of Delta Butane Gas & Fertilizer Company and of Delta Liquid Fertilizer Company, died Aug. 3 at his home in Helena, Ark.

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Bleached Kraft	✓	
Creped Kraft	✓	
Wax Laminated Kraft	✓	
Asphalt Laminated Kraft	✓	
Wet-Strength Kraft	✓	
Water Repellent Kraft	✓	
Stak-LOK Super Rough Kraft	✓	
Valve Bags—sewn or pasted	✓	
Open Mouth Bags—sewn or pasted	✓	
Flat Sewn Valve Bags	✓	
Flat Sewn Open Mouth Bags	✓	
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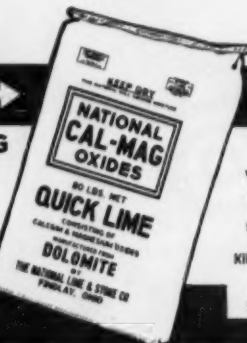
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CF Staff-Compiled TONNAGE REPORTS

FERTILIZER TONNAGE REPORT (in equivalent short tons) Compiled by COMMERCIAL FERTILIZER Staff

State	July		January thru June		Apr.-May-June Quarter		Jan.-Feb.-Mar. Quarter		July thru December		Year (July-June)	
	1955	1954	1955	1954	1955	1954	1955	1954	1954	1953	1954-55	1953-54
Alabama	14,887	14,771	844,071	924,968	410,529	426,577	433,542	498,391	267,041	147,702	1,114,238	1,074,892
Arkansas	9,292	5,930	270,894	313,787	136,306	147,461	134,588	166,326	59,887	52,438	330,776	366,225
Georgia	51,173	38,504	1,047,875	1,147,157	718,919	761,348	326,956	385,809	225,083	218,027	1,273,445	1,361,254
Louisiana	6,888	6,940	232,781	250,747	108,810	110,234	123,971	140,513	78,067	74,471	310,848	325,218
Missouri	11,433	9,467	394,979	500,020	205,628	226,893	189,351	273,137	268,257	256,427	682,690	756,457
N. Carolina	12,417	9,205	1,566,158	1,558,472	740,666	694,799	825,492	863,673	264,475	257,100	1,830,633	1,815,572
Oklahoma	3,423	2,879	63,799	72,809	28,029	31,627	35,770	41,182	58,406	71,558	122,305	144,367
S. Carolina	11,355	8,667	791,206	752,639	269,475	160,908	521,731	591,731	132,604	183,919	928,715	936,558
Tennessee	25,862	23,256	282,462	405,756	218,999	322,123	63,463	83,633	167,383	107,544	523,349	523,303
Texas	20,311	15,484	371,587	374,309	156,592	168,687	214,995	205,622	212,885	186,097	584,269	560,381
Calif. (reports submitted quarterly)			603,857	513,300	320,702	299,195	283,155	214,105	318,270	317,270	922,127	830,327
Virginia (reports submitted quarterly)			636,585	620,261	349,218	314,945	287,367	305,316	159,185	160,715	795,770	780,931
Ind. (reports submitted semi-annually)			919,988	896,104					285,673	283,987	1,205,661	1,180,091
Kentucky (reports submitted semi-annually)			433,102	489,024					91,386	88,905	524,488	577,929
New Jersey (reports submitted semi-annually)			231,686 ¹						53,030	57,923		289,614 ¹
Washington (reports submitted semi-annually)			124,186	101,779					58,162 ¹	*	182,348 ¹	*
TOTAL	167,041	135,103	8,583,530	8,921,132	3,663,873	3,665,897	3,442,381	3,769,438	2,642,432	2,464,088	11,149,314	11,233,505

(not yet reported)

* Not compiled

¹ Omitted from column total to allow comparison.

MARKETS

ORGANICS: Producers of Leather Nitrogenous Tankage continue in well sold positions for the new season at prices varying from \$4.10 to \$5.10 per unit of Ammonia, bulk, f.o.b. production point. Sewage Sludge Tankage is indicated, depending on the production point, at \$2.75-\$2.95 per unit of Ammonia and 50¢ per unit APA and \$3.00 per unit of Nitrogen and 40¢ per unit APA, bulk, f.o.b. production point for fertilizer purposes. Feather Tankage is indicated at \$4.75-\$5.00 per unit of Ammonia, in bulk, delivered Southeast.

CASTOR POMACE: After a long lasting shortage, the producers in the Northeast have offered a limited quantity for September shipment only at an advanced price of \$40.00 per ton, in bags, f.o.b. Northeastern production point.

DRIED BLOOD: The Chicago market is indicated at around \$5.25 to \$5.50 per unit of Ammonia for unground sacked Blood with the New York market within the same range.

POTASH: Demand from domestic sources is seasonally dull. Prices remain firm and unchanged.

GROUND COTTON BUR ASH: Increased interest in this source of Potash, which is primarily in the form of Carbonate of Potash, is noted and supply and demand appear to be in good balance. Current analysis vary from 38% to 42% K₂O

enabling the material to deliver at approximately the cost of Domestic Sulphate of Potash.

PHOSPHATE ROCK: Another of the Florida Phosphate producers has settled with the Union but 6 Phosphate mines still are struck. Production of Superphosphate and Triple Superphosphate continues on a very limited basis but at this time of the year no serious shortage has yet developed.

SUPERPHOSPHATE: Production has been diminished considerably by the Phosphate Rock Mine Strike but inventories are taking care of the current demand which is seasonally small at present.

AMMONIUM NITRATE: Rather little demand, on account of seasonal conditions, and supplies plentiful. Prices are considered steady in general.

SULPHATE OF AMMONIA: Stocks continue to pile up at producers' works as the domestic market is very quiet and the export market is governed by the result of the overseas bids for shipment to Korea.

NITRATE OF SODA: Demand is in seasonal dimensions and there has been no change in prices announced. Stocks are adequate.

GENERAL: Except for some movement of mixed fertilizer in Florida and California, activity is in seasonal dimensions with buyers contracting and building up inventories of fertilizer materials for fall use. No serious difficulty in the supply position is expected unless the Phosphate Rock Mine Strikes are greatly prolonged.

Borden to Market New Nitrogen Compound

Borden Co. has entered the chemical fertilizer field with a new nitrogen fertilizer compound, according to Augustine R. Marusi, president of the company's chemical division.

The new product, called "Borden's 38," is derived from urea formaldehyde and will release nitrogen steadily for periods ranging from six months to a year. It adds that 15 to 18 pounds of fertilizer will provide nitrogen to a 1,000-square-foot area of fine turfgrass with a single application.

The product is now available in 50-pound bags through wholesalers, and next spring will be marketed in smaller packages for home use, Borden's asserts.

Link-Belt has issued this folder, complete information on their new DS takeup line. Write for #2539 to Link-Belt, Dept. PR 307 N. Michigan Ave., Chicago 1.





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FOR SALE: One "good as new" 2-ton superphosphate acidulating pan. Six new Exact weight bagging scales at \$400.00 each. One slightly used 1/2-ton Sturtevant batch mixer. LONGHORN CONSTRUCTION CO., BOX 486, SULPHUR SPRINGS, TEXAS. Telephone No. 49.

FOR SALE: Rotary Dryers 5' x 30', 5' x 40', 4'6" x 50', 5' x 67', 6' x 60', 9' x 80'. (1) Pressure Tank 13,000 gal. 220#. Also Mixers, Storage Tanks, Screens, Elevators. Send us your inquiries. Brill Equipment Company, 2402 Third Ave., New York 51, N. Y.

SITUATION WANTED: Capable, alert young man, M.S. in Agronomy, age 32, married, extensive experience in agricultural field, desires opportunity with progressive concern. Technical, liaison, sales position preferred. Reply Box #31, c/o Commercial Fertilizer, 75—3rd St., N. W., Atlanta, Ga.

FOR SALE: (4) 15,000 gal. Vertical Welded Steel Tanks with coils. (12) 3,000 gal. Horiz. Aluminum Tanks, (5) Rotary Kilns and Dryers: 10'6" D x 105', 6' x 50', 5' x 30', 4'6" x 40', 3' x 25'. Also Pulverizers, Mixers and Conveying Equipment. Perry Equipment Corp. 1426 N. 6th St., Philadelphia 22, Pa.

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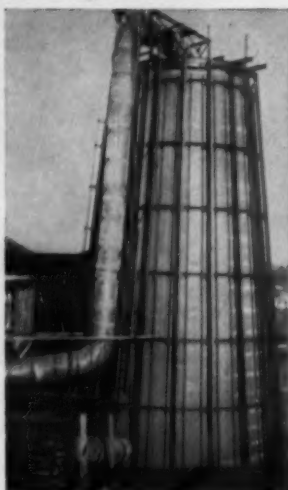
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The United States

To all to whom these Presents shall come, Greeting,

Whereas Samuel Hopkins of the City of Philadelphia and State of Pennsylvania hath discovered an Improvement, not known or used before, such Discovery, in the making of Pot ash and Pearl ash by a new Apparatus and Process, that is to say, in the making of Pearl ash 1st by burning the raw Ashes in a Furnace, 2^d by dipping and baking them when so burnt in Water, 3^d by drawing off and setting the Lye, and 4th by boiling the Lye into Salts which then are the true Pearl ash; and also in the making of Pot ash by placing the Pearl ash so made as aforesaid, which Operation of burning the raw Ashes in a Furnace, preparatory to their Dissolution and boiling in Water, is new, bears Little Resemblance; and produces a much greater Quantity of Salt: These are therefore in pursuance of the Act, entitled "An Act to promote the Progress of useful Arts", to grant to the said Samuel Hopkins, his heirs Administrators and Assigns, for the Term of fourteen Years, the sole and exclusive Right and Liberty of using and vending to others the said Discovery, of burning the raw Ashes preparatory to their being dissolved and boiled in Water, according to the true Intent and meaning of the Act aforesaid. In Testimony whereof I have caused these Letters to be made patent, and the Seal of the United States to be hereunto affixed Given under my Hand at the City of New York this thirty first Day of July in the Year of our Lord one thousand seven hundred & Ninety.

G. Washington

City of New York July 31st 1790.

I do hereby certify that the foregoing Letters patent was delivered to me in pursuance of the Act, entitled "An Act to promote the Progress of useful Arts", that I have examined the same and find them conformable to the said Act.

Edm Randolph Attorney General for the United States.

Delivered to the within named Samuel Hopkins the fourth day of August 1790.

W. Wilson

*First United States Patent Grant
July 31, 1790*

(Reproduced from the original in the collection of the Chicago Historical Society)

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This is a reproduction, slightly reduced, of the first United States patent ever issued. It was granted in 1790 to Samuel Hopkins of Philadelphia, for a process for producing potash.



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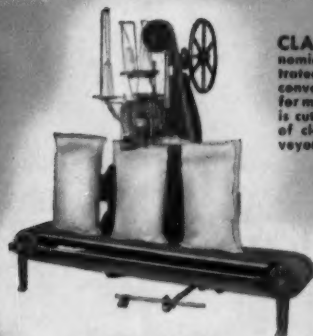
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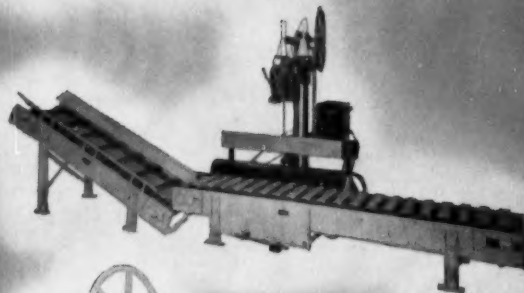


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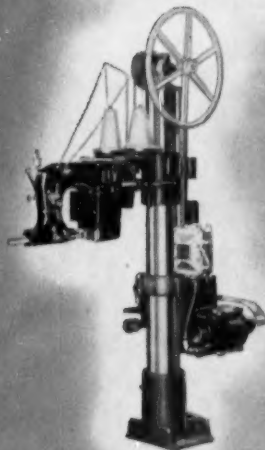
BAG CLOSING MACHINES



CLASS 21800 (left) for fast, economical closing of paper bags. Illustrated is Style 21800 H with 5 ft. conveyor and 80600 H sewing head for making tape bound closure. Tape is cut off automatically at each end of closure. Sewing head and conveyor adjustable vertically.



CLASS 20500 (above) machines are heavy duty, high production units for closing medium and heavy weight bags. Available with power-driven horizontal conveyor, inclined conveyor, or both; or with conveyor transmission unit only, for plant production line.



STYLE 20100 H (left), is a heavy duty, high production column type machine designed for use with plant conveyor systems. Sewing head is pedal controlled.

DUPLEX MACHINES (right) are designed for closing double bags. The first sewing head closes the inner bag; the second closes either the outer bag alone, or both bags together for extra safety. Also recommended for single closures where continuous operation is a must — operator can instantly switch to either head.

